

The Refrigeration Service Engineer

VOL. 11 NO. 1

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JANUARY . 1943



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Teach.

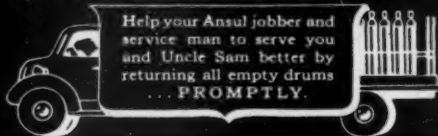
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THE REFRIGERATION SERVICE ENGINEER

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For complete information write for Condensed Catalog 200-A and Bulletin 190.



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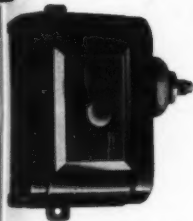
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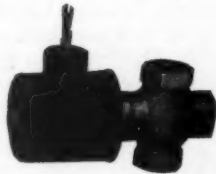
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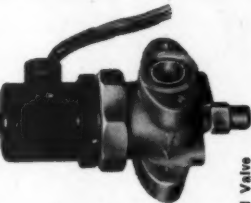


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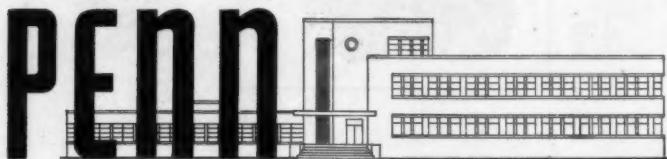
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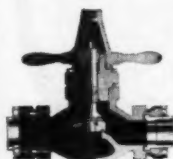
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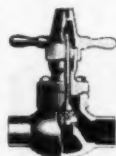
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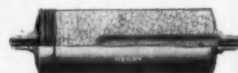
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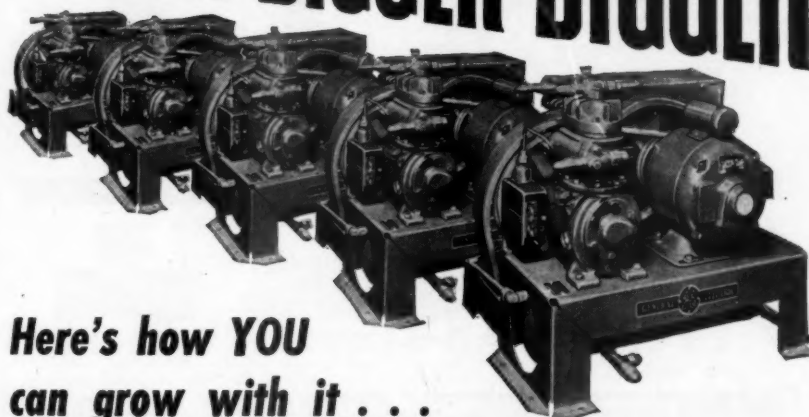


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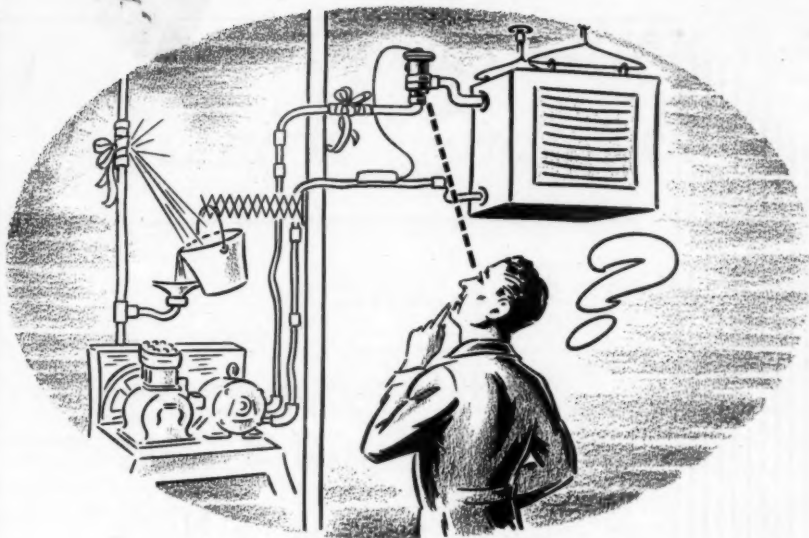


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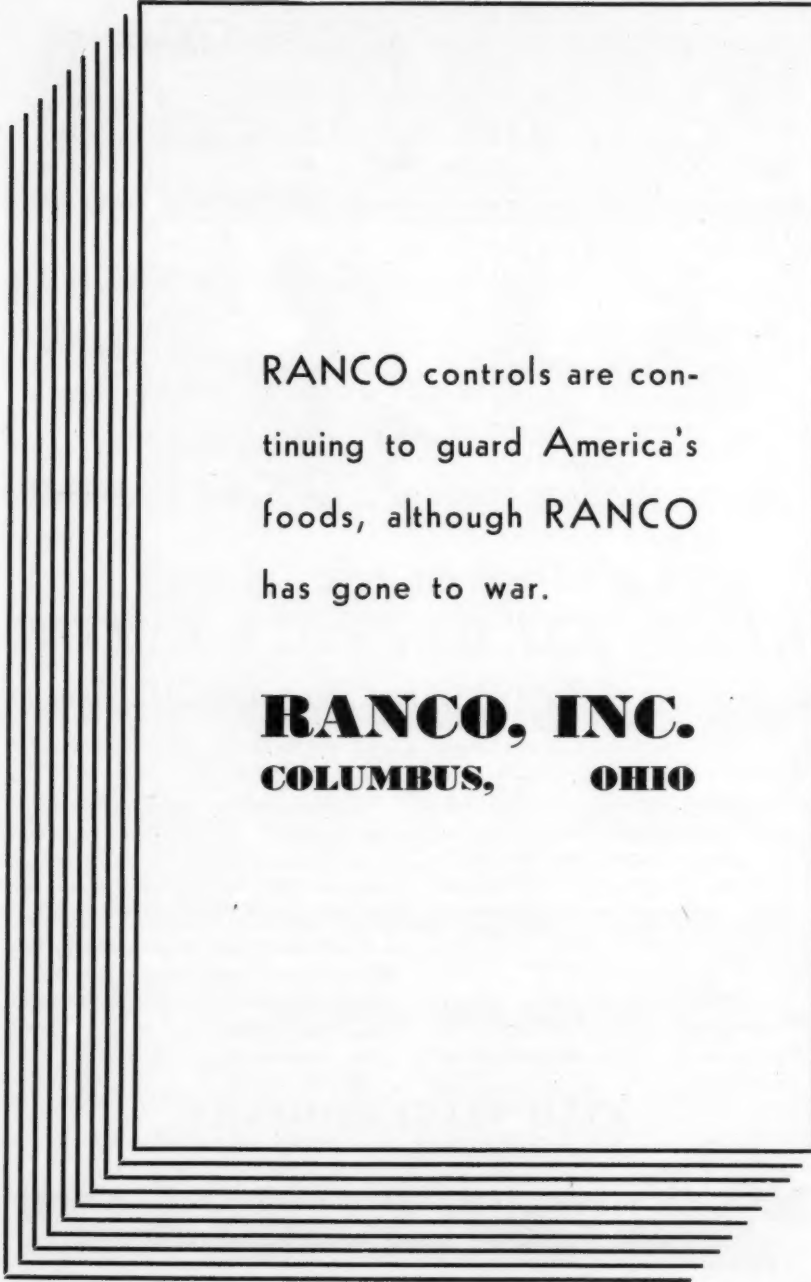
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The Refrigeration Service Engineer

Vol. 11

No. 1

January, 1943

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE
ENGINEERS SOCIETY

Cover

Walter P. Hill, who was presented with "Citation of Individual Production Merit" by President Roosevelt. This signal honor has been given to only six "production soldiers"—Article on page 30.

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The Refrigeration Service Engineer

Vol. 11, No. 1

CHICAGO, JANUARY, 1943

\$2.00 Per Annum

Insulation Substitutes

How They Are Being Tested for Practical Use in the War Effort

By Leonard K. Wright*

WARTIME conditions have brought about changes in industry, especially in design and the substitution of other materials for the scarcer or unobtainable ones. Plastics, for instance, have been used to replace various metal castings, forgings and stampings. Indeed, in many instances the substitute has been found even better than the original material.

Cork has been prominent as an insulation material, but with the theatre of war activity encompassing the Mediterranean, little or no cork has come through to America. Again, bottoms are more valuable when used for carrying ammunition, food, and vital supplies than cork and it has consequently now become more scarce in this country. There is considerable cork available but it is held for industry concerned with the war effort. Thus, men engaged in the cold storage industry have been driven to substitute insulation materials.

The REFRIGERATION SERVICE ENGINEER, September issue, told the story of some of the surprising experiments at Camp Lee with insulation substitutes—which prove that improvisation could provide insulating mate-

rials made of available vegetation that were more than adequate for use—including such widely diverse materials as hair felt, pine needles, oak leaves, gum, grass, and Spanish moss.

Portable Equipment Available

The U. S. Army has a great quantity of portable refrigeration equipment which can be set up or dismantled rapidly and shipped to a new locale. At Camp Lee, Va., the Army maintains a refrigeration school to train men of the Quartermaster Corps for the erection, operation, testing, servicing, and maintenance of all types of refrigeration units. We have recently even succeeded in securing a German refrigerating unit for study. It is possible that our students will be running into these things pretty soon and they should know how to keep them in operation. A photograph just released by the Marine Corps from Guadalcanal, shows a Japanese ice plant taken over by the Americans. The school at Camp Lee strives to give an all-round course of such magnitude that the graduates will be capable of taking over any and all such equipment and utilizing it for our own forces.

The faculty of the school have been inter-

* Civilian Instructor Refrigeration School, Quartermaster Replacement Training Center, Camp Lee, Va.
Released by Public Relations Office, Camp Lee, Va.



Leonard K. Wright, civilian instructor at Camp Lee's Quartermaster Replacement Training Center Refrigeration School, makes a test with the test chamber. The paper carton contains pine needles, one of the most effective substitutes employed.



Soldier-trainees of Camp Lee's Quartermaster Replacement Training Center collect leaves for the experiments carried on in discovering substitute insulation materials. Leaves, pine needles, and many other natural substitutes were investigated, and found to be practicable to take the place of cork.

ested in making available to the students all refrigeration data which would be helpful to the soldier-technician in the field. At times the technician might be faced with the necessity of providing some sort of a storage warehouse for temporary use, for instance for a small task force. Ordinary insulation materials may not be available for immediate use and therefore substitutes would have to be improvised. Modern warfare is dependent upon rapid thrusts by mobile units; the less equipment the more rapid the movement; the greater the chance of success.

Much information exists upon insulation and strangely enough just about as much misinformation. For instance the average man thinks sand is a good insulator, whereas this is not the case. Farmers have made use of leaves and straw for insulation for years and yet little data is available as to the actual conductive values of these different vegetable substances. Having had considerable tropical experience in the past, I ran a number of simple tests on vegetable insulations, with the thought of making use of the various leaves, grasses and other vegetable growths so abundant in the tropics. Insulation is a bulky material to ship and the space occupied could well be used for food, ammunition or other critical war material.

Leaves or Grass Insulation

Moisture in insulation cuts down its value. Under a tropical sun it is possible to dry leaves or grass rapidly and by intelligent application provide an excellent substitute for the usual cork, glass wool, rock wool, or other more or less common insulations. Even though the insulation might be lower than a standard manufactured product, the walls of a temporary structure could be made as thick as necessary, for vegetation is abundant, so much so in the tropics it might be said to grow overnight.

About the only things required to build a storage warehouse, where indigenous vegetable matter is used, would be the hardware and insulation paper. Trees can be felled and the rough lumber necessary for the structure can be ripped out of the trunks. Thus a tremendous saving in weight and bulk of material can be saved.

The average man is not interested in tropical applications but at the same time there are occasions where a cheap means of providing a warehouse would be considered and the structure built if a cheap, efficient insulation were available. Even standard

insulations vary as to the actual quantity of heat passed, dependant upon moisture content and the nature of the material.

Thus, for ordinary applications it should not be necessary to have an insulation value ("k" factor) worked out to more than two places. The third figure will vary with most of the natural insulation materials. Where materials are available for the mere gathering and treating, very thick walls could be installed and a very low heat leakage factor would be involved.

Those interested in working out approximate "k" values of various insulation materials may be desirous of constructing a test chamber, and the various other pieces of equipment needed to form the test panels, after the simplified design worked out by our experiments.

Making Enclosing Cover

For each kind of insulation to be tested there should be provided an enclosing cover or envelope. These envelopes are best made of manila paper. It is essential to use the same kind of paper on all tests, or if possible to use the same insulation paper that will be used on the job. The vegetable insulations should be thoroughly dried and then sealed in a moisture proof envelope. Reference to Fig. 1 (see drawing on next page) will serve to bring out the shape of the envelope and provide the dimensions for same. This envelope is to be folded along the dotted lines and the lapping edges provided with an adhesive. If possible to obtain, use rubber cement or a pitch base cement. Do not use the water soluble adhesives. They retain moisture and under test may allow the seal to be broken on the envelope.

In order to fold the envelope accurately and rapidly an envelope forming mold should be used. To make the mold make use of some $\frac{1}{4}$ -inch plywood, three ply stock. Cut two pieces of stock as per Fig. 2, 12 in. x 12 in. Then cut two pieces 12 in. x 15 in. and label these pieces number 2 and 4, whereas the first two pieces are labelled 1 and 3. Sand the edges of these pieces and slightly round the edges, as they are to be handled. To use the mold assemble as per Fig. 3, laying them down in numerical order. Lay the envelope forming mold on top of the envelope as indicated in the sketch. The first fold is made by lifting the long end and folding it over the mold, shown at 1. Then either of the sides can be folded over and cemented in place. Leave the end open. If desired, a

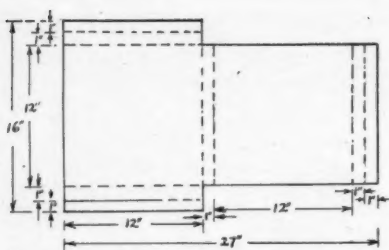


Fig. 1 Envelope
Make of Manila Paper To be folded on dotted lines.

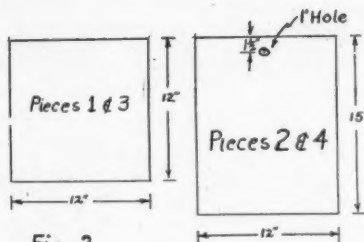
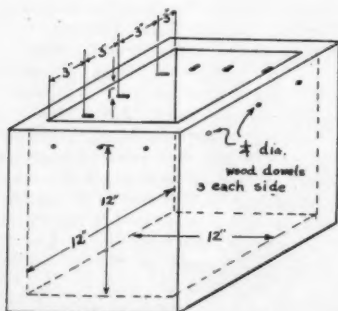
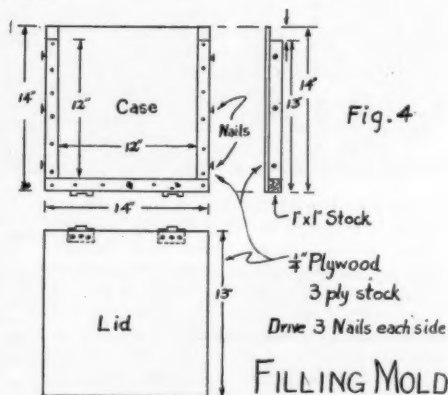
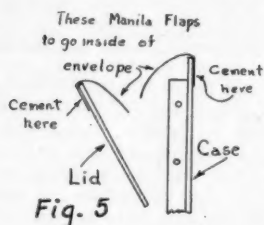
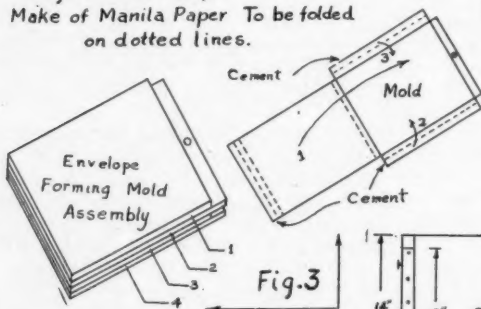
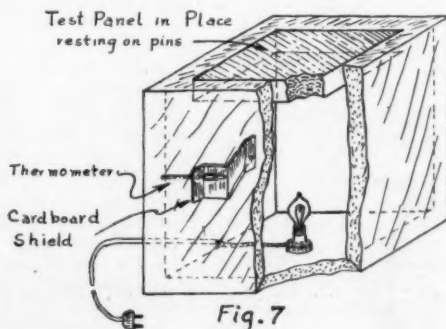


Fig. 2
Make of 4 pieces of $\frac{1}{2}$ " plywood
Envelope Forming Mold



Test Cabinet
Fig. 6



piece of plywood may be laid on top of the form and the envelope allowed to dry thoroughly. It is best to permit the cement to dry before attempting to slide it free of the envelope. To remove the form grasp either number 2 or 4, and carefully extract it, then the other plywood layers can be easily pulled out. This makes for a well-formed envelope, one which will be a standard when made this way. There will be no variance due to imperfect envelopes.

The next piece of equipment required is a filling mold. The structure is shown in Fig. 4, and consists essentially of a case and a hinged lid. The $\frac{1}{4}$ -inch plywood specified may be used, but if heavier stock is available it may be used to produce a stiffer job and one capable of withstanding greater abuse.

A series of nails or screws should be placed down each side of the case and after the envelope is in place a piece of heavy twine is wrapped around the case to hold it together firmly. The twine appears to work even better than latches or hooks as there is a certain amount of tension imposed, lacking in a hasp or hook assembly.

Two manila flaps should be cemented to the filling mold. These flaps extend down inside the envelope after it has been inserted and act as aprons when filling the envelope. Fig. 5 shows how these flaps are cemented to the case and lid edges.

Whatever the loose material to be tested may be it should be carefully dried, then packed with moderate pressure into the envelope. When full, open the mold and slide the envelope up sufficiently to work on the end, so that it may be sealed. Take care to keep the envelope in proper shape for it must fit snugly in place for proper test.

Making Test Cabinet

The test cabinet may be made of wood or of any standard board form insulation available. The illustration (Fig. 6) shows the construction. Inside should be 12 in. x 12 in. x 12 in., when completed and top or loose section is in place. If solid 1-inch stock is not available the walls can be built up of $\frac{1}{4}$, $\frac{1}{2}$ or any thickness of stock to make the desired wall thickness. Again, the walls may be made of lumber but should be of tongue and groove stock to prevent infiltration and consequent losses. The top section should be identical with the wall structure so that the heat leakage of the cabinet itself can be determined. The loose top piece rests upon

$\frac{1}{4}$ -inch wood dowels set on 8-inch centers and project about an inch into the cabinet. Make sure your dimension inside is from the bottom of the cabinet to the top of the dowels.

An assembled view is shown in Fig. 7. A socket is set into the center of the cabinet, preferably on a one-inch block of wood. This wood block in turn can be pinned to the bottom by means of wooden skewers. See that the electric cable is taped up on both inside and outside, to prevent leakage and to make sure the cord cannot be pulled which would cause a shifting of the socket position.

In the center of the cabinet wall drill a hole for a thermometer which will provide a snug fit. Thermocouples would be ideal and then a number of readings could be made, not only of inside temperatures but of surface conditions. This would furnish interesting data for the experimenter. For the average man interested in merely obtaining a two-place figure of the "k" factor of a material the single thermometer will suffice. To shield the thermometer, fold a piece of cardboard as illustrated in Fig. 7, allowing a space of about one inch to exist. This will permit convecting currents to flow without hindrance and at the same time eliminate direct radiation effect from the electric light bulb used as the heat source. The worker of course can provide any other means of heating, but the electric bulb is probably the simplest.

Testing the Cabinet

To test the cabinet place the panel in place and seal the edges with a strip of one-inch adhesive tape. Experience has shown that either a 10-watt or 15-watt bulb is sufficient for ordinary tests. The ten-watt bulb is best but results can be cross checked by use of the 15-watt element. One watt per hour will result in 3.412 B.t.u. being liberated per hour. Therefore the heat load, using a 10-watt bulb would be 34.12 B.t.u. per hour.

It is suggested that the test box be set up and allowed to operate for four hours to come to balance. Keep the ambient temperature constant and check to find when the cabinet has come to balance. From the thermometer readings the temperature difference may be determined. Let us assume there was a 14-degree temperature difference. If the heat input per hour is 34.12 B.t.u., the heat leakage per wall, and there

(Continued on page 36)

A Refrigeration Serviceman's Nightmare About OPA

By Irving J. Fajane*

WHEN—yes I said when—a serviceman gets into bed and tries to sleep: across his mind flashes:

O-P-A W-P-B L-A-B-O-R
P-A-R-T-S G-A-S

Now, he is not counting sheep; he's got trouble with that alphabet again. As a child, he had trouble putting the letters in their proper order. Now as a man, the letters are more scrambled than ever. As he struggles with this bad dream, he finds himself unconsciously trying to put these letters and their meanings into some logical order; and as the last is first, his dream opens with the latest amendment to Maximum Price Regulations No. 165, reinterpreting the ceiling price of parts.

The refrigeration serviceman realizes that OPA has a tremendous job. That it has, and is endeavoring to regulate wisely and fairly. Many services must be regulated by general overall conditions. Yet, the refrigeration serviceman feels he is treated unfairly. He feels he should be a lawyer, an accountant and bill collector, as well as a serviceman.

Practical Difficulties

Let's take a look at just one page in the record. His ceiling is frozen as of March, 1942. His main job is the preservation of foodstuffs (which at present has no ceiling). He makes yearly contracts with food handlers. If the equipment breaks down, he is subject to a lawsuit for food spoilage. He may be unable to make the call for a number of reasons. If he is fortunate, he has a P-126. Not having the necessary parts, he goes to his refrigeration supply jobber. The jobber is out of stock. The jobber has filed a PD-1X. The material is on the way. The serviceman jumps into his car and goes to another supplier. Same answer there. He runs out of gas. So he goes off to OPA. No trouble at all to get gas. Very simple in fact.

* Aetna Supply Co., New York, N. Y.

Having a little time on his hands, he visits a law library. There he reads the several Supreme Court decisions on "peon labor." With the newly acquired knowledge, he decides that he, as a service agency, cannot contract for labor in advance. Therefore, his maintenance contract (which includes labor) is null and void, and he is not liable for food spoilage. However, some of the lower courts may disagree with his view. In any event, he has a lawsuit on his hands; and it costs money.

Only being subject to call 24 hours per day (seven days a week), so, in his spare time, he studies accountancy. After due study, he decides, what with materials becoming scarcer; wages higher, his liabilities greater, he must set up, in addition to his other reserves (see any bank statement) one for legal counsel and expenses. Discovering that his overhead cannot absorb this additional reserve, it is necessary to raise his prices.

Petition for Price Increase

So he files the requisite application with OPA, petitioning for an increase. (Incidentally every refrigeration serviceman knows about this form, and undoubtedly OPA is swamped with them.) Of course, January 1st, 1943 was the dead line, but there are amendments. These additional reserves, never before part of his overhead, OPA will quickly grant him—no increase.

In the meanwhile, municipal health authorities are condemning scarce foods, left and right. Doctors are insistent that their patients have refrigeration. To help matters, Nature comes along with a cold snap, ruining water-cooled units, burning out motors.

With his newly acquired knowledge, he tells his customer to file a PD-1A (while at the same time, convincing his customer that a freeze-up is not included in the contract and is an additional expense that must be borne by the customer) with WPB. The

(Continued on page 37)

Electrical Work and Motors

(CONTINUED FROM DECEMBER ISSUE)

STARTING in the December issue, the following is the second in a series of articles on the fundamentals of electric motors. Due to the shortage of man-power many service concerns have found it necessary to train men over draft age and women, and these newer employees will find the information in these articles on electrical work and motors of special interest and value. Another reason for publication of this information at this time is the shortage of motors as well as copper and other repair materials, making it necessary now more than ever before to maintain motors with scrupulous care so as to prolong their time of usefulness as long as possible. While the information is not new, the subject, we believe, is of sufficient importance to claim interested attention.—Editor.

A THREE-WIRE system, composed of two black wires and one white wire, is shown in Fig. 8. Both black wires are hot wires and the voltage from either black wire to a ground is 110 volts. From either black wire the voltage to the white wire is 110 volts, but the voltage from one black wire to the other black wire is 220 volts. While the electrical pressure of one black wire is 110 volts above ground, the pressure of the other black wire is 110 volts below ground, the difference between them being 220 volts. In the case of an alternating current system, there will be a rapid change, first one black wire being 110 volts above ground and then 110 volts below, while the other line is reversing similarly.

A hookup similar to that of Fig. 7 is shown in Fig. 8, which includes a motor hooked up for 110 volts connected in series with a control and a switch which includes a fuse. The control may be either a temperature or pressure or manual control. A 220-volt motor hooked on to the same wiring system through a 2-pole fuse switch and a relay operated by a control is shown to

the right of Fig. 8. The two black wires from the electrical system are used in this case connected to the inlet of the switch. The outlet of the electrical switch goes to the two top connections in the relay and the two bottom connections pass directly to the motor. If while the switch is closed the relay is closed, the motor will operate so that anything which will cause the relay switch to close will start operation. This relay consist of moving contacts which connect with the stationary contacts and the moving contacts are actuated by an electric coil with an iron core which, by means of the electro magnetic effect closes the switch. The contacts in this relay are sufficiently heavy to carry a current heavy enough to take care of the motor with little danger of the contact being burned out. The temperature or pressure control used might be enough to carry the current for a small size motor; but for motors of one hp. and larger, the amount of current required to start generally would be hard on the control contact since this control is more delicately constructed.

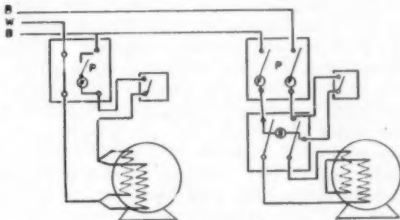


Fig. 8

With the hookup as shown, there is a current through the holding coil "S" down through the left side of the switch when it is closed, down through the coil "S" through the control when it is closed, and up into the right hand line through the fuse and switch, back to the other black line. So that when the main switch and the control switch is closed, coil "S" is actuated and draws the relay switch closed, which causes the motor circuit to be completed through one side of the motor back to the other side of the line, causing the motor to operate. As the

control opens, the circuit through the coil "S" is incomplete and the contacts in the relay drop open, usually due to gravity or a combination of gravity and a light spring, thus the motor circuit is incomplete and the motor stops.

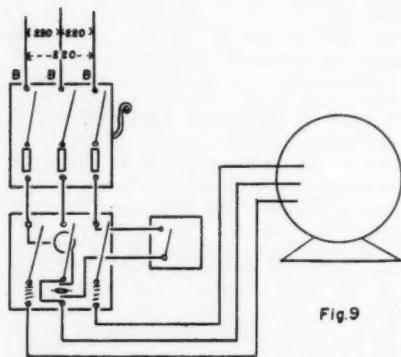


Fig. 9

A 3-wire system in which all the wires are placed is shown in Fig. 9. The voltage between any pair of these wires is 220 volts. This type of wiring system is frequently used in commercial installations where a considerable amount of power is used. It is a 3-phase system and a 3-phase electric motor is shown hooked to the electric system through a hand switch, a relay and a control. The hand switch is a 3-blade knife switch fused below the switch blade. The outlet from the switch goes directly from the three top connections in the relay. The three contacts on the relay are connected to the three wires of the motor so that when the knife switch and relay switch are closed, the motor operates. The two outside lines are connected in series with low resistance meter coil which is used as a motor protection in conjunction with some sort of current overload device.

When, due to an excess of current, either overload coil is heated beyond a certain limit, it will cause the contact shown in series with the holding coil to open. When the contacts in the relay box and in series with the holding coil are closed, and when the control is closed, the relay is closed. In this case there is a circuit from the left black line through the holding coil, through the overload contacts to the control switch and back to the right hand line. Thus, when the overload contacts are closed and the control closes, the holding coil causes the relay contact to be drawn closed and the motor circuit is completed. This type of

wiring system can be used on a 3-phase, 220-volt motor, or a single-phase, 220-volt motor might be operated from any one of these black wires in a manner similar to the diagram shown on the right part of Fig. 8. A 110-volt circuit cannot be obtained in this type of system; 220-volt circuits can be obtained in single phase and the three lines together make a 220-volt, 3-phase line, but no other voltages can be obtained.

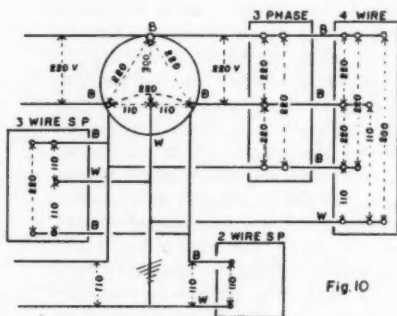


Fig. 10

A 4-wire system, which is coming more into use, is shown diagrammatically in Fig. 10. In this there are three black wires shown at the three angles of an equilateral triangle. Between any two of these wires 220 volts is produced. Using all three, we have the 3-phase, 220-volt line. In the base of the triangle a white line is shown which has a voltage to the left black line of 110 volts, to the right black line of 110 volts, and to the top line, approximately 200 volts.

The various take-offs shown show how a 220-volt, 3-phase power connection may be obtained, how 220-volt single-phase connection may be obtained, and how 110-volt, single-phase connections may be obtained. Thus it is possible to use this kind of system to get 110 volts for lighting purposes and small stores, 220 volts for larger single-phase motors that may require 220-volts, and 220 volts 3-phase current for 3-phase motors.

Principle of Operation

To understand the principle of operation of electric motors, we must remember the effects of an electric current passing through a wire. It has two effects: first, to cause heating in the wire, and, second, it sets up a magnetic field around the wire. In the operation of motors, the magnetic field is the point of particular interest.

To understand how an electric magnet operates, the following discussion of permanent magnets is given. This is illustrated in Figs. 11a to d. A bar magnet having a north and south pole is shown in Fig. 11b, demonstrating how the lines of force pass from one pole to another. We have mag-

bar, and the circuit is completed similarly to a series electrical circuit.

The straight lines between the north pole of one bar and the south pole of another indicate the attraction between the poles. These magnetic lines of force act in the manner of rubber bands, tending to draw the



Fig. 11a

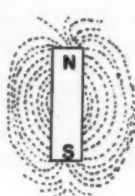


Fig. 11b

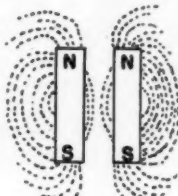


Fig. 11c



Fig. 11d

netic circuits similar to electric circuits and in this case we have a magnetic circuit complete from the north pole through lines of force to the south pole and back through the magnet from the south to the north pole, completing the circuit.

The north pole is so-called because it repels the needle of a magnetic compass which points north or attracts the end of the compass needle pointing south. The south pole will repel the end of the compass needle pointing south and attract the end of the needle pointing north.

The magnetic field prevailing when two bar magnets are placed side by side with like poles adjacent is shown in Fig. 11c. In this case, the lines of force from the two north poles come out tangent to each other and pass to the outside of the pair of magnetic bars and into the south pole.

poles together except that the force tending to draw the poles together increases in inverse proportion to the square of the distance between them.

A wire passing into the paper with the current flowing in the direction shown is shown in Fig. 12a. In this case the lines of force pass around the wire as shown by the arrows. If a coil of wire, as shown in Fig. 12b, consists of two or more turns, it will produce the effect of a south pole at the top of the coil and a north pole at the bottom. In Fig. 12c, a coil of wire is shown with an iron core, and with the current flowing in the direction indicated the upper end will be a south pole and the lower a north pole, with the magnetic circuit completed through the bar and externally from one pole to another, as in the case of the permanent magnet illustrated in Fig. 11a.

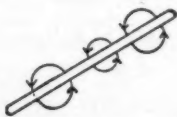


Fig. 12a



Fig. 12b

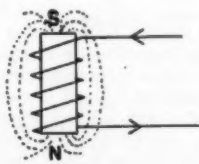


Fig. 12c

Two bar magnets with unlike poles adjacent are shown in Fig. 11d, which shows that the lines of force pass from the north pole of one magnet straight to the south pole of the other and then from the south to the north pole in the bar, and then from the north back to the south in the other magnet

If the current is increased in the direction shown, it will make the north pole and the south pole stronger or the strength of the magnetic field will be increased. If the amount of current flowing is decreased, the magnetic field will be decreased, and if the direction of flow should be reversed this will

cause the north pole to become a south pole and vice versa.

If there is no current supply but the bar is a permanent magnet in the coil, as shown, there will be no voltage and no flow of current in the coil. If the ends of the lead wires were connected to a voltmeter and the magnet were withdrawn from the coil, a voltage would be set up in the coil which would be indicated by the voltmeter. If the magnet should be withdrawn entirely, the voltage would drop down to zero and remain there. But if the magnet were re-inserted in the coil a voltage would be built up as indicated by the voltmeter while the magnet was being inserted.

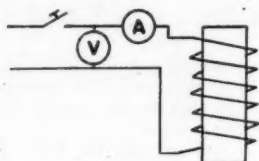


Fig. 13a

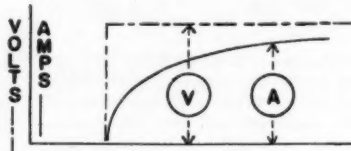


Fig. 13b

If the magnet were inserted and withdrawn from the coil alternately, an alternating voltage would be set up in the coil. This makes a simple alternating current generator. The voltage set up depends on the number of turns of wire in the coil and the strength of the magnet and the rate at which the magnet is moved in and out of the coil. The voltage generated is proportional to the rate of change of the magnetic field about the wires and upon the number of wires in the coil.

Inductance

A heavy iron core covered with a large number of turns of heavy wire is shown in Fig. 13-a. With the switch closed and with a series of direct current supply a current will be passed through the ammeter to the coil and the voltage will be indicated by the voltmeter. It has been stated previously that increasing or decreasing the magnetic field around a coil or coils of wire set up a voltage in the coils and this effect is called inductance.

The voltage measured by the voltmeter as the switch is closed immediately jumps to the full line voltage, but the current as measured by the ammeter may take some time to build up to the maximum flow. The reason for

this is that a voltage is created in the coil due to the fact that the current is being built up in the coil and thereby increases the magnetic field; that is, as shown in Fig. 12-a, we may set up a voltage by inserting or removing a bar magnet from a coil. In this case the magnetic field about this coil is increased or decreased by increasing or decreasing the amount of current passing through the wire. As the switch is closed, the current is building up in the coil quite rapidly.

This is building up a magnetic field which affects every turn of the wire and tends to build up a voltage in the opposite direction to the applied or line voltage so that at first the voltage thus generated, called the coun-

ter voltage, is a maximum, and the difference between the applied voltage and the counter voltage is the effective voltage which causes a current to flow through the wire.

The current would not be increasing the magnetic field if it did not build up, consequently no counter voltage would be generated and the effect that the applied or line voltage would be passing a maximum current through the coil. Thus Fig. 13-b shows how the current increases over a period of time to the maximum value while the voltage increases to the full value as soon as the switch is closed.

(To be continued in February issue)

NON-EMPLOYMENT DECREASES

WHILE the number of men employed in industry has risen from a monthly average of 30,545,000 in 1937 to 36,621,000 for the first ten months of 1942, the average number of man-days of idleness due to strikes has fallen in that period from 2,369,000 to 397,000. Man-days of idleness for the first ten months of this year are only 28 percent of the average for the last five years of peace, though monthly employment in 1942 was up 119 percent of the five-year average.

COMMERCIAL

INCREASE BUSINESS BY
DOING A MORE EFFEC-
TIVE JOB OF SELLING

Selling

Southern Refrigeration Service Group "Rations" Parts to One Appliance per Home

By Robert Latimer

A SERIOUS step toward prolonging the useful life of service organizations was taken in the Louisiana, Texas and Arkansas area centering around Shreveport, La., when twenty radio, refrigeration and commercial refrigeration service organizations met for establishing a special "parts rationing system" to stretch out the life of existing parts inventories.

Until such a time as parts can be obtained in large quantities or made by members of the organization with their own equipment, all twenty members have pledged themselves to replace parts on only one appliance or radio per home, thus "rationing" out parts slowly enough to be able to meet at least partially the heavy demand for service now swamping all dealers.

In the event that a customer has a radio or refrigerator both out of service and requiring new parts, the serviceman will have to simply inform her that he can fix either but not both, and allow her to make the choice.

"We feel that this is absolutely necessary in view of existing shortages of parts," Mr. P. A. Davis, head of the newly-formed association, said. "Shipments of new parts have fallen off to almost nothing among

most of our service organizations, and only those few fortunate enough to have equipment for making their own parts or reconditioning perfectly broken or worn ones are able to handle their business load. We want to serve everyone possible, but are certain that the only way to do it will be to cut down the flow of parts equably among all domestic calls."

Uses Patriotic Issue

There will be a few instances of hard feeling and irritation among customers, of course, according to Mr. Davis, but he believes that this can be salved by applying the patriotic issue of conservation to every job. "Women know they cannot buy this or that item any longer," he pointed out, "and consequently it won't be difficult for them to understand that we must likewise be experiencing difficulty in obtaining parts."

Another resolution adopted by the group was that an old or worn part must be exchanged for every one which goes into either a domestic or commercial refrigerator. Parts which would be simply discarded in the past can be rebabbitted or built up in one way or another to continue

functioning, according to Mr. Davis, and often salvaged parts from two or three jobs will provide enough equipment to repair another.

Some of the members have been buying old lathes and metal working equipment from home craftsmen going to war, and thus working out enough machinery to make some of the simpler parts required for repair work. One refrigeration service organization serving Shreveport has been

able to replace its parts inventory through contracting with elderly mechanics who own their own power metal working tools to make them.

Letters explaining the one-appliance-per-home plan have been prepared and will be mailed following every service call to maintain good will. Commercial work, particularly that concerned with foods distribution, of course will not be thus limited.

Automobile Dealer Uses Frozen Foods As Leaders for Home Freezer Sales

By Bert Merrill

ONE automobile dealer who has found that a well-managed sideline can go a long way toward paying the overhead and keeping his Oldsmobile showroom busy is W. C. Grebe, head of Grebe Motors, St. Louis, Mo.

In eight months Mr. Grebe has sold \$14,000 worth of "sharp freeze" home food lockers through his showroom, starting out with them as an incidental sideline early in January. Originally a small stock of twelve was purchased and placed along the inside front window where their gleaming white surfaces could easily be seen by passing motorists. Meanwhile four regular Oldsmobile salesmen were sent out to contact former automobile customers with the Deepfreeze unit involved, selling four of them the first week. This encouraged Mr. Grebe to put in a larger stock of 24 models likewise shown in the showroom.

Everybody at Grebe Motors was surprised when people began coming in and asking for frosted meats, fish, vegetables, etc., many of them showing disappointment when it was found that the company was selling only the unit. So many appeared that Mr. Grebe decided to put in a complete stock of frozen foods, including two nationally advertised lines.

The units on display were rearranged to form a long counter consisting of two four-

hole and one eight-hole cabinets and half a dozen Deepfreeze home lockers, each stocked with a separate variety or brand of frosted foods. An old parts cabinet from the stockroom was brought out, painted tan, and equipped with materials for wrapping and weighing purchases. To all effects, the change amounts to putting in a small "grocery store."

Food Sales as "Leaders"

Now, food-buying customers come in all day long, and salesmen who formerly sold expensive automobiles are handling 35 cent frozen food packages continuously. "Although we show a nice profit on \$50 a day or so in food sales, that isn't the real idea," Mr. Grebe explains, "Actually, selling the foods has brought us sales of 50 home-locker units at \$275 and better. Customers who know nothing about the home units become interested in them right away through watching us use them, and are first-class prospects after two or three calls. We suggest to every customer that she can economize on her food bill by using the home locker, and stress the fact that she can save tires and gas by simply buying several weeks' food at a crack."

That this works out may be seen from the fact that one woman after making several stops ordered a unit sent out to her

basement. Two weeks later she bought another to accommodate more foods, and sent in two friends who were also interested. There has been little solicitation necessary since the "store" was set up.

The amount of food sales developed has become such that it will be necessary to build a cold-storage locker room merely to assure that the customer can be supplied, according to Mr. Grebe. A 100-foot square space back of the showroom partition is

being remodelled into a sharp-freeze room which will hold enough stock for a week's selling. Formerly, Grebe Motors leased a cold room in the St. Louis Butchering Company storage plant, but too many trips back and forth to restock the units on display have been required. Deliveries to customers' homes (limited to purchases above \$2.50) are made in a specially built motorcycle compartment, dry ice keeping the foods chilled until arrival.

Special Classes Supply Trained Mechanics for Service Work

MAJOR appliance dealers who have attempted to go into service work and find it impossible for the lack of skilled employees are now being given an opportunity to go ahead with their plans since the Northern California Electrical Bureau, San Francisco, has gotten mechanic-training classes under way.

Approximately 50 skilled workers per month are being turned out and sent immediately into retail dealer's shops, according to the Bureau, all composed entirely of men beyond 50 and thus not subject to the draft, women of all ages, and younger men with physical disabilities of one kind or another which exempt them from service.

Classes were opened in late August at the Samuel Gompers Trade School in San Francisco and Central Trade School in Oakland, following a survey made by the association of the plight of dealers in northern California. Classes are open to anyone who can prove himself exempt from military service, and of course, to women of any age to 55. The first call for trainees produced more than 500 applications (more than triple the number which had been expected).

Almost all of the men and women applying, it was found, had some experience in the work in the past. Classes of 22 members each were chosen from among this group, the remainder given notice to

begin new classes at a later date. The entire 500 will be trained within a few months, it was emphasized by the association. Training is given without charge of any sort, school space donated by Oakland and San Francisco, and instructors paid from association dues. Approximately 35 per cent of the first graduating class was composed of women from 20 to 35 years old, and for whom dealers showed a preference in most instances. An appeal will be made for more feminine trainees.

Candidates Specialize

The course covers 80 hours to be completed in 34 days. Each candidate is allowed to specialize following a general course to familiarize them with all appliances first. Mechanics specializing in washing machine repair, refrigerator service, commercial refrigeration maintenance and small appliance repairs have been most heavy in demand.

Appliance dealers who plan to make service work at least pay the overhead for the duration register with the association, state a preference for older men, disabled men or women, and graduates are sent to them immediately upon graduation. To date none have been rejected by potential employers and the San Francisco area is already enjoying many benefits from this timely training program.

Limiting Outside Work to Three Days a Week Pays

By Donald Delayon

A GROWING trend among refrigeration service organizations in Kansas City, Mo., is the limitation of outside working time to three days a week, thus permitting the service force to catch up on shop work which otherwise accumulates untouched, and to get out important rebuilding and overhauling of defense-plant refrigeration.

More than a dozen firms have announced via newspaper and customer direct mail that henceforth their outside calls must be made on combinations of Monday, Wednesday, and Friday; Tuesday, Thursday, and Saturday, etc. The value of this plan is readily recognizable; although it means that some firms will undoubtedly have to refuse a certain amount of business, that accepted will have a much better chance to go out on schedule.

Service business is now at a peak load in the Missouri city; with a limited number of mechanics to handle it. Thus, several shops which were handling refrigeration repairs for defense industries as well as rebuilding commercial and domestic refrigerators found that their men were fighting against a jammed schedule which

absolutely didn't permit time to be spent in the shop.

"Our men were trying to work late at night and squeeze in lunch hours in the shop" one refrigeration service manager pointed out, "And they were unable to stand up under the load. Thus, we are now telling every customer that we must handle her repairs on one of the three days and attempt to make a specific appointment. Hiring an extra shop man helped, but it has been a problem of splitting time between shop and outside work to stay even with our schedule."

The three-day plan has helped to save tires and rubber, of course, and permits plenty of time for the shops operating on this system to route their men most efficiently from call to call. Men who were working eleven hours a day and longer (some even made appointments as late as midnight in home-refrigerator calls) are getting more sleep and efficiency is increased. "We're willing to forego a little profit in favor of keeping near our schedule," it was summed up. "Without this plan we can easily bog down to the point where we are a month or more behind."

Appliance Conservation Drive Started by Electrical Association

THE twin topics of appliance conservation and the important position of the electrical industry during the present war are featured in a comprehensive promotional program begun in October by the Electrical Association of Philadelphia, composed of 202 appliance dealers, wholesalers, manufacturers, and other electrical interests.

A series of nine half-page newspaper ads directed to the public and all commercial users of appliances and electrical equipment has been developed as the portfolio for the campaign. Eight of the ads will

be scheduled for insertion each month during 1942 and 1943. The first, pushing the slogan "Extra Care Means Extra Wear" for major and small appliances in the home, is headed with the cut of a baby, and the question "A Hundred Guardians For Me?" copy points out that the electric refrigerator, range, roaster, washer, water heater, toaster and other appliances guards the health of a youngster above all else.

Another demonstrates simple, practicable points for maintaining the long life of small appliances, such as oiling of mov-

ing parts, care in putting away cords, attaching and disconnecting them, with a long list of do's and don'ts which any housewife can readily memorize. A list of appliance shops surveyed and certified as capable of making efficient repairs is attached to help the housewife quickly put any appliance back into serviceable condition.

Other ads are directed at users of commercial equipment, following the same lines, and to manufacturing plants, stressing the ability of electrical industries to solve lighting, power and other problems. All ads invite housewives, businessmen and commercial users to contact the association with any sort of electrical problem.

Record Servel Installation in Texas Housing Project

PURPORTEDLY one of the largest gas refrigeration mass installations in the country's history was announced recently, when the Houston Housing Authority at Houston, Texas, announced delivery of 1225 new Servel Electrolux refrigerators for the Kelly, Irvington and San Felipe Housing Project recently completed in the Texas city.

The refrigerators, six and eight cubic-foot models, are to go into two, three and four room apartments in the huge housing project built by the government to solve vital housing problems for war-plant and ordnance workers, many of whom previously had been living in trailers and shacks or paying excessively high rent for poor accommodations in Houston. Gas will be used for heating, water heating, cooking and refrigeration thus providing 100 per cent gas service for occupants. Apartments are equipped with individual gas furnaces which could be installed more rapidly and with less future maintenance difficulty than central systems, small four-burner gas ranges and small water heaters.

The Servel refrigerators arrived at the housing projects, covering a large area outside the city, on two special freight trains,

and are being installed as rapidly as apartments are finished, according to E. W. Blum, director of the Houston Housing Authority. Cost of the 1225 gas refrigerators amounted to \$97,000.

OPM ESTABLISHES MAXIMUM FRIGIDAIRE PRICES

MAXIMUM prices for all sales of three mechanical household refrigerators produced by the Frigidaire Division of the General Motors Corporation, Dayton, Ohio, are established at 1941 levels in two actions taken by the Office of Price Administration December 28, 1942.

The manufacturer's base prices in sales to distributors are established in Order No. 2 to Revised Price Schedule No. 102 (Household Mechanical Refrigerators) and the maximum retail prices are contained in Amendment No. 5 to Maximum Price Regulation No. 110 (Resale of New Household Mechanical Refrigerators). Dealers' prices are computed from the base prices established by the order in accordance with provisions of Revised Price Schedule No. 102.

In ascertaining the maximum prices, OPA considered the differences between the new models and the 1941 models in respect to type, finish and features, such as cold walls, porcelain or lacquer finishes and hydrators. Prices established are shown in the following table:

MAXIMUM PRICES ESTABLISHED FOR FRIGIDAIRE
REFRIGERATORS

Model	Manufacturers' Base price	Maximum retail price		
		Zone 1	Zone 2	Zone 3
D9-42	\$100.97	\$199.86	\$201.86	\$206.86
DP9-42	111.19	220.30	222.30	227.30
CD9-42	122.70	252.70	256.70	260.70

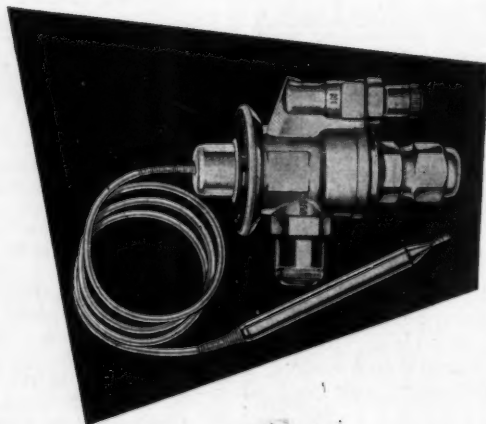
The zones are those established by the company in conformity with the industry's pricing system.

Production of all new refrigerators ended April 30, 1942, at the order of the War Production Board. The new models were in the process of manufacture at that time, and the Frigidaire Division had sufficient unassembled parts to complete their production.

\$\$\$

Milton W. Crawford,
Grand Junction, Colorado

"I might say that you do have the best magazine on the market in this line and it has helped me out on lots of tough jobs."



Modern Refrigeration, entering as it does, every phase of American Life, is a symbol of the progress, industry and inventive genius of freemen.

It is supremely natural that the engineering skill, knowledge and experience that has made such a large contribution to peacetime living should be important to the preservation of that principle of living . . . doing double and triple duty today to preserve food stuffs of civilian workers, improving wartime production processes, following Armed Forces to the far corners of the globe.

A-P DEPENDABLE Refrigerant Valves have been keeping pace with all wartime developments in Refrigeration, offering typical precision engineering, reliable, accurate, super-sensitive refrigerant Control to every phase

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*Symbol of American Enterprise
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In new wartime applications of Refrigeration, and for essential replacement purposes, remember the proven dependability of A.P. Valves! Progressive Jobbers everywhere stock and recommend them—

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AUTOMATIC PRODUCTS COMPANY
2454 NORTH THIRTY — SECOND STREET
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Citation of Individual Production Merit Awarded to Civilian "Production Soldiers"

AMERICA'S "production soldiers," who are showing almost unbelievable ingenuity in working out ways to lick the Axis, received new recognition when President Roosevelt personally bestowed production suggestion honors on ten men at the White House on Thursday, December 10. In the first ceremony of this kind in the country's history, six workers, chosen from the war industries in cooperation with local labor-management committees, received Citations of Individual Production Merit signed by Donald M. Nelson, War Production Chief. Four additional workers received certificate awards.

The result is expected to be a further stimulant to employee participation in factory suggestion-box systems, and still wider recognition of the fact that practical ideas of production men, dropped into suggestion boxes by the thousands each week, are actually playing a vital part in increasing production and speeding victory in this great "war of machines."

Award to Civilian Workers

Unique in this or any previous war is believed to be the award by the President to civilian workers of citations for workable ideas for improving production—awards similar in many ways to the Congressional Medal of Honor, given men who render outstanding individual service to their country in the armed forces.

Typical of the production achievements honored at the White House is that of Walter P. Hill, Detroit development engineer for Wolverine Tube Division of Calumet and Hecla Consolidated Copper Co., who devised a notable improvement in methods of fabricating a small primer tube, used in the firing mechanism of all the millions of large shells produced in this country. Mr. Hill augmented his work at the plant with long hours spent in a fully-equipped machine shop in the basement of his home, and developed a process that effects remarkable savings in critical materials as well as in man-hours and machine time.

One operation now does work that previously took six separate production opera-

tions. Since devising this improvement, he has been busy, with the cooperation of his employer, in working with Ordnance offices from coast to coast, assisting other plants to make full use of the new method, and multiplying the importance of the production increase accomplished, on a national scale. Mr. Hill's portrait is shown on the front cover of this issue.

Mr. Hill is the only Michigan man among the six Citation Award winners to be honored by the President. The complete list is: Walter P. Hill, Wolverine Tube Division of Calumet and Hecla Consolidated Copper Co., Detroit; Joseph H. Kautsky, Link-Belt Co., Indianapolis; Clinton R. Hanna, Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.; Edwin Curtiss Tracy, RCA Manufacturing Co., Camden, N. J.; Madison E. Butler, Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.; James A. Merrill, Goodyear Tire and Rubber Co., Akron, Ohio.

Certificate awards were given at the same time to: George Smolarek, Packard Motor Car Co., Detroit; Daniel Walter Mallett, Borg-Warner Corp., Rockford, Ill.; Herbert Ruper James, National Tube Co., McKeesport, Pa.; Stanley Crawford, RCA Manufacturing Co., Camden, N. J.

SERVICE COMPANY ORGANIZED

THE Youngstown Refrigeration & Service Co., a refrigerator repair firm located at 1117 Hillman St., has been incorporated at Youngstown, Ohio. The purpose of the incorporation, it is stated, is to preserve the name of the firm. Reese Davies, its founder, died this past year and Mrs. Elizabeth J. Davies, widow, is continuing the firm's operations.

Roy L. Slaughter,
Milwaukie, Oregon

"Enclosed please find a money order of \$2.00 for another year subscription to THE REFRIGERATOR SERVICE ENGINEER. I have enjoyed and received loads of good out of it."

New Sheet Board Used as Substitute for Sheet Metal

HOW sheet board ducts and casing are being used in air conditioning installations to save huge quantities of critical metal, was described recently by T. M. Cunningham, Construction Manager of Carrier Corporation, Syracuse, New York.

Stating that American ingenuity has again proved itself in producing a substitute for a critical material, Mr. Cunningham points out that while the new sheet board does not entirely replace sheet steel, so great is its application that a recent duct system installation estimated at 300,000 pounds required only 66,000 pounds of sheet metal. Sheet boards were substituted for the remaining 234,000 pounds.

"In selecting a sheet metal substitute, several factors must be considered," the construction manager states. "These include availability of substitutes, ease of fabrication, strength and durability of finished duct or casing, rigidity of material, and surface resistance to air flow.

Other Requirements

"In addition to these factors, the substitutes for sheet metal must meet the following requirements: They must have a hard, smooth finish, and be non-hygroscopic, non-warping and non-inflammable. Preferably the material should be workable with tools usually used for sheet metal work so that the construction of the sheet board ducts will not involve a retooling program."

Listing Asbestos Ductboard, Asbestocite, ARA Board, Transite, Masonite and Hard Board as among the best known substitutes that meet these requirements, Mr. Cunningham said: "These boards, and numerous others available, have several advantages over sheet metal used in ducts. They are more rigid so do not require the 'cross-breaking' that is used in metal ducts. They have higher insulating value so the B.T.U. loss or gain is less than in sheet metal ducts."

From experience in using the metal substitutes it is believed that $\frac{3}{16}$ in. thick sheet board may be used throughout for some air conditioning systems, especially those rang-

ing in size from 10,000 to 50,000 c.f.m. By using only one thickness for an entire duct system, the Carrier construction manager points out, fabrication costs are reduced and tooling problems are simplified, resulting in lower installation costs. In systems larger than 50,000 c.f.m., it is advisable to use $\frac{1}{4}$ in. board to eliminate stiffening and other construction "extras."

Design of Ducts

The design of ducts made from sheet board is not different from those made of metal. The surfaces of the substitutes are not so smooth as that of sheet metal. Therefore, the resistance to air flow of the sheet board duct is greater. However, it is not sufficient to make necessary a larger duct to compensate for the increase in resistance. As square vaned elbows, and other "fittings" may be made in sheet board ducts, the layout of the air conditioning system does not differ from that which has long been the practice in the industry.

Continuing, Mr. Cunningham says: "Supporting the sheet board duct is the same as that used with sheet metal duct with one exception. Conventional band iron or rod trapeze type hangers are used with the same spacing that has long been the practice of such work, but the supports are heavier since sheet board ducts are usually of greater weight than metal ones."

The Carrier executive believes the use of sheet board ducts will probably continue after the metal shortage no longer exists. "With air conditioning recognized as a vital war production tool, sheet metal requirements need not limit its use, for sheet board is a proved substitute. Americans again have demonstrated their ingenuity."

Gaylord Randall,
Rice Lake, Wisconsin

"Please send me a binder for R.S.E. magazine. I've got three full now and don't want to take any chance of losing any issues, as I refer to them quite often for information."

Refrigerator Repairs Declared Essential Service by Manpower Commission

IN FURTHERANCE of the program to keep essential workers in activities which contribute to the war effort, the Selective Service Bureau of the War Manpower Commission has advised local boards of 34 essential occupations in repair and hand trade services, including automobile mechanics and electricians, in which occupations registrants may be deferred as "necessary men," it was announced January 9.

Similar instructions also were sent to local boards, for their guidance when considering occupational classifications, together with lists of 80 essential occupations in health and welfare services and 15 in technical, scientific and management services.

It was emphasized with the announcement of these listings of essential occupations, however, that they are merely those which so far have been certified by the War Manpower Commission and that they are by no means exclusive. Men in other occupations likewise may be deferred as "necessary men," if their local boards are convinced that they are essential in their jobs.

Pointing out that the War Manpower Commission had certified that repair and hand trade services are essential to the support of the war effort, the Selective Service Bureau said that its occupational bulletin on this activity covers repairs of refrigerators and other devices, also repair of electric, gas and other installations in domestic, commercial and industrial buildings.

The bulletin on technical, scientific, and management services covers "The supplying of technical, scientific, and management services to establishments engaged in war production; union-management negotiation services; and the publication of technical and scientific books and journals."

While the occupational bulletins list essential occupations in the specified activities, such bulletins serve only as a guide to local boards and not as orders for "blanket deferment," as the Selective Training and Service Act strictly prohibits blanket deferments. Furthermore, local boards must determine that an individual registrant is a necessary man in a particular occupation before grant-

ing an occupational classification.

In classifying a registrant employed in activities essential to the support of the war effort, local boards give consideration to the following:

(a) The training, qualification, or skill required for the proper discharge of the duties involved in his occupation;

(b) The training, qualification, or skill of the registrant to engage in his occupation;

(c) The availability of persons with his qualification or skill, or who can be trained to his qualification, to replace the registrant and the time in which such replacement can be made.

RECORD LABOR FORCE NEEDED

TWO years after Pearl Harbor Uncle Sam will need a record labor force, 63,200,000 pairs of hands, to wage the war, make the munitions of war, to raise the food to keep the home hearth blazing, the War Manpower Commission estimates.

By the end of 1943 or early in 1944 the Commission expects that 9,700,000 citizens will be in the armed forces, 20,000,000 in war industry, 19,600,000 in civilian industry, 7,900,000 in year-round farm work and the remainder in miscellaneous occupations. Additional millions will be needed seasonally in the various agricultural areas.

The Commission, as it tackles the biggest personnel job in history, recognizes that millions of workers, forsaking the habits of a lifetime, must be recruited from non-war industry and minority groups and among the handicapped persons, married women, students and older persons who would not normally be engaged in any occupation.

The Commission already is confronted with steadily growing labor shortages. Out of 270 industrial areas surveyed it found that 102 now are afflicted with shortages, 77 anticipate shortages, and 91 have a surplus of labor. The areas comprise every city in the country of 50,000 or more population and every smaller city where 5,000 or more workers must be added to meet peak production demands.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

SQUEAKY SEAL

QUESTION 528: Four weeks ago I was called to service a Frigidaire compressor which was froze tight but not leaking.

When opened, I found the discharge valve retainer broken, no oil and the eccentric strap tight on the eccentric. The seal was free. I loosened the eccentric, cleaned and polished with crocus cloth, placed new valves, rotary seal and charged 8 oz. of number 2 suniso oil. After placing in the cabinet it ran like a new one for several days.

Now it has developed a slight squeak which varies in tone and starts after the compressor has run for at least 5 minutes, continuing for the rest of the cycle. Each time it starts it is quiet for the first 5 or 6 minutes and then starts to squeak. It is not in the motor or belt. And doesn't sound like a seal. Is it not possible that the eccentric and strap are worn and the heat expansion would cause this?

ANSWER: I think that the squeak in your compressor is most likely due to the seal not getting sufficient lubrication. It seems unlikely that the eccentric strap could cause this noise, because if the eccentric is worn, and undoubtedly it is, you would have more clearance between the eccentric and the strap which would allow better lubrication. A worn eccentric may produce a knock but could not produce a squeak unless the compressor is actually out of oil again. It may be that your seal is not bearing on the full surface and thus is not getting lubrication. Another possibility is that the tension on the seal is too great, thus forcing the shaft back against the thrust washer, causing it to squeak. Too much tension on the seal may also cause the seal itself to squeak.

LIQUID LINE DRAINS OUT

QUESTION 529: I have a 1/2 hp 6H3CL Brunner compressor on a small walk in with coil and accumulator fed by a Fedders T.E.V. I have a drier and sight glass in the liquid line and when the machine runs the sight glass is full and shows no bubbles. However, when the machine stops the liquid

bubbles through and finally empties the sight glass. The sight glass fills, however, when the machine runs and condenses gas. The question is, why does the receiver empty? Is there not enough gas in the receiver to cause a frost back on the start of the cycle? Should the T.E.V. close off after the machine stops and help the liquid from entering the coil?

ANSWER: The fact that the sight glass on the refrigerating system empties during the off cycle does not in my opinion mean that the receiver is empty. Rather it indicates that the expansion valve shuts off tightly preventing all leakage into the evaporator. Since the upper end of the liquid line is closed tightly the liquid line itself has a tendency to drain back to the receiver. Liquid, as you know, will always seek its own level. It is probable that the upper part of the liquid line is warmer than the receiver and vapor refrigerant will gradually rise to the top of the liquid column causing the liquid refrigerant to settle back into the receiver. I would suppose that the emptying of this liquid line would take as long as one-half an hour.

If the expansion valve were leaking the slightest bit of vapor refrigerant rising to the top of the liquid would escape into the evaporator and the pressure in the receiver would force more liquid into the line, thus keeping it full. If the expansion valve holds perfectly then this vapor refrigerant can not escape to the evaporator.

FRIGIDAIRE METER MISER

QUESTION 530: I have a Frigidaire Meter-Miser which doesn't seem to be following the rules, if I am to judge by an answer in your department recently, I understood that this type of machine recharged with Herveen should operate at twenty-three pounds and twenty-eight inches, right? This one seems bound to operate at from forty to fifty pounds and about fifteen inches. Whether it has air in it or not is what I am worried about. When I started working on it the motor would only turn a few times and it seemed to load up and the overload relay

would shut it off, but after a while it started working and the pressure read about five pounds and twenty-eight inches. As soon as it stopped they equalized at zero. Incidentally, I couldn't find a leak so I thought probably it hadn't taken in air, but after I charged it then I got high pressure and the compressor would run nicely for about five minutes then it would seem to load up suddenly and stop. After a few seconds the overload relay would kick off and the condenser fan continued operating and after the low side built up to about twenty pounds it would start again and go nicely for about five minutes again, and repeat. Then after the third running the thermostat would shut it off. Is that the way it's supposed to act? Is that where it gets its name of meter-miser? By resting two or three times during each cycle?

I would also like to know what is used for lubrication in these units, the refrigerant seems as though it would spoil the action of mineral oil. It removed all oiliness from my fingers when I got some on them, as well as Carbon Tet would.

Do you think this unit should be discharged and evacuated by an outside source before charging? And should the pressure stay as low as twenty-three pounds?

When I got the evaporator to frost completely the pressure ran as high as seventy pounds, so I discharged some and let it back down to about fifty, then as it ran and cooled off it gradually went down to about forty-five, and seemed to stay about there. I would like your opinion on this matter as soon as possible.

ANSWER: According to a pressure temperature relation chart on Herveen, which I have recently secured, a pressure of 45 pounds head doesn't seem too high. I am enclosing, herewith, a copy of this chart which should help you in your present problem. You will note that at 90° F. the pressure of Herveen is forty-five pounds and during the summer months when the room temperature may be as high as 80 or 90°, it is quite probable that your condensing temperature will run as high as 100°. Likewise, you will note that at -4° F. the pressure is 10 inches of vacuum and the suction temperature of these units under normal operation will probably not go much lower than -4°. The fact, however, that the unit is cutting off on the overload relay would seem to indicate that your pressures are still too high or that further purging is necessary. I think if I were you I would try

purging a little further in effort to get the machine to run for a full on-period.

A thought which has occurred to me in this type of trouble is that Herveen has a lower specific gravity than F-114 which would mean that it would pass through the restrictor faster than would F-114. It would seem that in order to make these machines work satisfactorily with Herveen it would be necessary to add additional restrictions. I would think that 5 ft. of .095 tubing would be about right. This has been a thought in my mind for some time and while I have suggested it to others, I don't know of anyone who has tried it, therefore, I don't know if the idea is any value in overcoming the apparent trouble encountered in changing to Herveen. Seven ounces of oil with a viscosity of 250 to 300 is the proper charge for these units. When changing the refrigerant from F-114 to Herveen, all the oil and refrigerant in the system should be discharged and new oil charged in.

FRIGIDAIRE MODEL C

QUESTION 531: I have a Frigidaire 1 hp. SO₂ condensing unit, water cooled and a Model C compressor (1929-1930).

High pressure overload cuts the machine off when the pressure reaches about 55-60 pounds head. All water lines, connections, strainers, tank and outlet were cleaned. A good flow of water is keeping the system well cooled. System was pumped down and purged for air.

When the machine was shut off the water went through it fast and clean, and the weight on the high-pressure bellows would not drop the least. The only way I could get the weight to drop was to drain the compressor head of refrigerant. As soon as the shut-off valve on the receiving tank was opened the bellows would raise very rapidly. All this happens while the unit is not operating.

One expansion valve on the job (one walk-in box and display case hook-up) is leaking bad, causing the compressor base and suction line from the coil to be coated with frost. With the weight tied down so that it could not disconnect the unit, the maximum head pressure reached was 90 lbs. and settling down to 70-75 lbs. The strainers in the liquid line must be open because both box and case are well refrigerated. The only trouble lies in the high-pressure overload.

It is my belief that the bellows on the high-pressure overload are to blame. What do you say?

ANSWER: I believe you are correct in your supposition that the fault with this Frigidaire unit cutting off on the high pressure control is in the control itself. A maximum of 90 lbs. head pressure and an average of 70 to 75 lbs. is a very good operating pressure for these units, and you can not expect to bring it down to a lower point.

Since your operating pressures are O.K. then the fault must be in the control itself. It is probable that the control is out of adjustment and it cuts off on too low a pressure, it may be that moving the weight further out on the arm will readjust the pressure sufficiently. It may even be necessary to replace the high pressure control with one of the more modern types available on the market.

TEMPRITE OVERCHARGED

QUESTION 532: I have installed a Temprite MP5 bottling plant with a Copeland 495 compressor using Methyl gas $\frac{1}{2}$ inch suction line and one-eighth liquid line in a bottling plant last January.

When we installed same it held the water at the thermometer on the Temprite at 36 degrees but when the weather got warm the temperature of the water at the thermometer on the Temprite would raise as high as 50 degrees. We have done everything that we know to do to correct same but we cannot now get the water below 48 degrees.

The head pressure is operating at around 120 pounds, the switch is set to cut in at 27 and cut out at 11 pounds. We have a sight gauge on and it does not show any bubble and is as clear as a crystal. The liquid line is just a little warm, not hot, and the suction line sweats to the compressor and at the suction valve on the compressor it frosts some times. We have tried by putting on a new body and it does not work any better than the old body. We have added gas to same and cannot find a leak and it does not correct same. The inlet water is approximately 75 degrees today and the outlet water at the compressor 90 degrees. We have a surge tank and an oil separator of the proper size for each by Temprite.

ANSWER: You have not mentioned in your letter what type of liquid control is used in this refrigeration system, but I take it for granted that since it is a Temprite unit the liquid control is a highside float. If this is the case the indications are that your system is over-charged with refrigerant.

The fact that the suction line sweats all the way to the compressor and at times will frost the suction valves, is an indication of an overcharge of refrigerant. These systems should be charged the same as any flooded system equipped with a capillary tube or a highside float. In other words, the charge should be balanced until frost or sweating will occur for a short distance out of the evaporator. In the present condition of your system it will be necessary to purge until sweating no longer occurs near the compressor and until you can feel a warm suction line within a short distance of the Temprite unit.

GRUNOW MODEL SD

QUESTION 533: I have been called to service a Grunow, Model SD type D unit. I was told that they had to have it charged every spring since they got it nearly eight years ago, and as it didn't work properly I started charging it, but I couldn't get it so that it worked as well as I wished it would, so I charged it a little more and then decided it was overcharged, so I left it that night and the next day I started it up and there was a proper gurgle in the evaporator for a few minutes, then it practically stopped, only a slight burp once in a while, but the float did not seem stuck, and when I shut it off it gurgled in the suction line, so I opened a joint and let out some refrigerant, but when I tried to start it again, it seemed to be working against pressure and didn't start good, and when I opened the purge valve, it would blow a little and then no more for a little while, and that made me decide the filter-dehydrator unit was clogged so I took out the entire unit and replaced the dehydrator, which I found to be very thoroughly plugged.

Then when I had reassembled it and started it up I purged it several times till I was sure the air was out and let it run for some time, but it wouldn't get cold enough to even condense moisture on the evaporator, but it was gurgling quite properly and the refrigerant was very evidently circulating because the condenser got warm, but it certainly doesn't work properly. Would you say it was because it was still overcharged or is the compressor inefficient because of having worked against too much pressure? I haven't checked the ability of the compressor as I didn't have the convenient fittings to connect on at the suction side.

What I can't figure out is how the refrigerant can be circulated without cooling unless it can be still overcharged. The full charge of this unit is four and a quarter pounds, but how would I go about getting the system empty so that I could weigh in the charge and know how much was in it? Or is it better to just experiment at taking out or putting in as it seems to need?

ANSWER: The symptoms you have given indicate that the Grunow refrigerator is overcharged, and that liquid refrigerant is flooding back to the compressor. Of course, it is possible too that the compressor is inefficient, but you will be unable to determine this point until the proper refrigerant charge is obtained in the system. The removing of the liquid from the system in the Grunow is easy because it can be poured out in the liquid state and if there is any opening in the bottom of the evaporator or the outlet of the metering device, this connection can be broken and the liquid allowed to be forced out through the opening. Any clean container will be suitable to catch this liquid so that it can be charged into the system again.

Carrene has such a high boiling temperature that it can be handled in open containers in the liquid state. The boiling point of Carrene is around about 105°, therefore, open containers are suitable for handling this refrigerant. Some Grunow models have a purge valve in the bottom of the evaporator through which the refrigerant can be drained, others have a flared tube connection at the outlet of the metering device which could be broken and utilized as a means of draining the system. Any such point available will be suitable for this purpose and it is necessary to run the machine occasionally in order to create pressure in the condenser to force the refrigerant out and pump the vapor out of the evaporator. Charging of the system should be done in much the same manner as any highside float system, or in other words, refrigerant should be charged in until frosting occurs a short distance from the evaporator on the suction line.

Charles J. Bodinger,
Gary, Indiana

"I find your magazine both interesting and helpful in my refrigeration work, and eagerly look forward to the arrival of each new copy."

INSULATION SUBSTITUTES BEING TESTED FOR PRACTICAL USE IN THE WAR EFFORT

(Continued from page 17)

are six of them, would be 5.686 B.t.u. per hour per 14-degree differential. From this we can determine that one wall, which is one square foot of area, has a "k" value of .4061. This really means .4061 B.t.u. per hour per degree F. per square foot of this material. Now we can also say that 5 walls would have a heat leakage of 2.0305 B.t.u. per hour per degree F.

Knowing the value of the test box assembly, so far as its five walls be concerned, any other test panel can be slipped into place as the 6th wall, left for a period of hours, until stabilization is secured, and then from the temperature differential, the approximate "k" value of the test panel can be determined. For example, suppose our cabinet now has a 15-degree differential. This is $\frac{1}{14}$ th more than the previous run. The value of each of the five walls is 2.0305. Under 15-degree differential these five walls would have a heat leak of 30.4575 B.t.u. per hour. The total heat load is known to be 34.12, the difference is therefore 3.7625. Now if this value be divided by the temperature difference, as $3.7625 \div 15 = .2508$. This would be the "k" value of the test panel.

Repeat tests with a number of test panels of similar materials and take the average. The "k" value will be close enough to use on any commercial application, but the fact which must be borne in mind is that the insulation tested must be maintained in the same condition under which it was tested. Any increase in humidity will alter the "k" value.

Experimentation Will Help Win the War

In the present crisis, widespread experimentation with substitute materials to produce new uses for plentiful raw goods and substitutes for those materials no longer readily available from abroad, will go far to help win this war of production against the axis. Experimentation in the refrigeration field, as in every other phase in American business and production, is one more means of getting our American armed forces up to the front lines "fustest with the mostest."

National Refrigeration War Council Formed at New York Meeting

THE National Refrigeration War Council was formed at a meeting held January 6 in the Commodore Hotel, New York City. Present were representatives from eight refrigeration groups, including manufacturers, jobbers and service men. Charles C. E. Harris, Boston, chairman of the Trade Relations Committee, RSES, represented the service men as alternate for President E. A. Plesskott, who could not attend.

The purpose of the National Refrigeration War Council is to bring into focus and make available to the Government the cumulative knowledge and experience of the industry, so that its complete resources may most effectively be utilized for the winning of the war and the well-being of the public.

A. H. Holcombe, Jr., President of the National Refrigeration Supply Jobbers Association, was chairman pro tem of the New York meeting, which was the second since the body was first launched at a dinner party attended by representatives of various branches of the industry on November 20 in the Palmer House, Chicago. A preliminary organization meeting was held on December 6 in New York. Membership in the Council will consist of the President of each refrigeration group, or alternate.

The groups represented at the meeting on January 6 in New York were the American Society of Refrigerating Engineers, the Air Conditioning and Refrigerating Machinery Association, the Standard Refrigeration Compressor Association, the National Electrical Manufacturers Association, The Refrigeration Equipment Manufacturers Association, the National Refrigeration Supply Jobbers Association, the Commercial Refrigerator Manufacturers' Association and the Refrigeration Service Engineers Society.

John Wyllie, Jr., of Temprite Products Corp., Detroit, who is President of REMA, was elected chairman of the National Refrigeration War Council and A. H. Holcombe, Jr., vice-chairman. Charles C. E. Harris, of RSES was elected secretary.

One of the features of the organization meeting was a get-together with the members of the War Production Board's Industry Advisory Council. These gentlemen, M.

G. Munce of York Ice Machinery Corp., A. B. Schellenberg of Alco Valve Co. and F. S. McNeal of Universal Cooler Corporation, came to the meeting on invitation extended by Mr. Holcombe.

Considerable discussion took place at the afternoon session between members of the National Refrigeration War Council and members of the Industry Advisory Council, and it was decided that for the present, at least, negotiations between the Council and the War Production Board would be conducted through the Industry Advisory Council, whose members were named by the WPB to study maintenance problems.

The question of a minimum inventory requirement for service men under the revised WPB Repair and Maintenance Order No. P-126, was brought up at the meeting, but best information available was that licenses will henceforth be limited to concerns having inventories in 1941. The revised order is slated to become effective shortly.

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A REFRIGERATION SERVICEMAN'S NIGHTMARE ABOUT OPA

(Continued from page 18)

answer—no copper—use plastic or steel tubing. Of course, plastic tubing becomes brittle at freezing or lower temperatures, and is not so good at above 170° F. So, many municipal authorities prohibit its use for other than water lines. So steel must be used. OH yeah!

The serviceman still has his P-126. A new machine will answer the problem, under emergency repairs and maintenance. Oh, Oh, look at Limitation Order L-126 and its amendments. Maybe a new motor? What about Limitation Order L-221?

So the refrigeration serviceman wakes up. Back to the old way and the old prices. Lots of guys have a much tougher job.

§ § §

MIDWEST SUPPLY JOBBERS

THE next meeting of the Midwest Refrigeration Supply Jobbers Association will be held Monday, January 25, at the Fort Des Moines Hotel, Des Moines, Ia. The meeting will start at 12 o'clock noon.

Herman Goldberg's Annual Christmas Party



PICTURED above are a few of the merry-makers at Herman Goldberg's Sixth Annual Christmas Party, which was held on the night of December 11 in the Mural Room of the Morrison Hotel, Chicago. This event, which has become a trade institution, saw about the usual attendance, in spite of transportation difficulties, and the program of entertainment arranged by the genial host of the occasion was pronounced superior even to the high marks registered in other years.

Service men, jobbers, manufacturers and assorted salesmen, with their ladies, participated in the happy event, which got under way about 10:00 p.m. Johnny Jones and

his famous orchestra, "The Jones Boys," ushered into the limelight such stellar acts as "The Three Make Believes," a reigning sensation at Chicago's College Inn for many weeks, Professor Slyter with his tricks of unbelievable magic, the pretty, musical Malone Sisters, Eddy Burnett and Lucile, Dick Burns and Frank Sheppard. The climax of the program was an "athletic" event—a dual hobby horse race for men and women.

Everybody had the time of his or her life. None enjoyed himself more than Herman Goldberg, who circulated among his guests from near and far, exchanging greetings and distributing good cheer with a most lavish hand.

H. BLAIR HULL, FRIGIDAIRE ENGINEER DEAD

THE death of H. Blair Hull, widely known inventor and research engineer for Frigidaire Division of General Motors Corp., occurred recently at his residence in Dayton, Ohio. He was 51 years old. Born in St. Clairsville, Pa., Mr. Hull had been a resident of Dayton for 23 years. He was a graduate of Cornell University.

A World War Veteran, Mr. Hull spent three years following the war in France where he was in charge of refrigeration plants for the Refrigeration Division of General Motors Corp. In 1921 he came to Dayton as research engineer for Frigidaire. He held a large number of patents on his inventions and received the Modern Pioneer Award in 1939 for distinguished achievement in the field of science.

He perfected the air cooling system for fever cabinets and had also done extensive research work for the iron lung, blood bank and Pavex machines. He was author of "Household Refrigeration," published in 1933 by Nickerson & Collins Co., which is the only book of its kind published and is used as a textbook in colleges. Mr. Hull held memberships in the Engineers Club, the Dayton Art Institute, the First Lutheran Church, the American Society of Refrigerating Engineers, and was a 32nd degree Mason.

COPPER SUPPLY NOT ADEQUATE SAYS WPB OFFICIAL

"RECENT statements quoted in the press," according to H. O. King, director of the WPB Copper Division, "have conveyed the impression that the supply of copper is adequate to meet all military and essential civilian requirements. Widespread acceptance of such statements," he continued, "would constitute a threat to our entire war production program. The supply of copper is not adequate and never will be while this war is on. A number of WPB limitation orders have eliminated the use of copper from thousands of civilian products. The Army and Navy have saved considerable amounts of copper by reducing their requirements wherever possible. A vigorous program of substitution has been carried on.

"Further, several hundred million dollars are being spent on facilities for new projects to increase production, while scrap programs have resulted in the collection of twice the tonnage expected at the beginning of 1942.

WORCESTER CHAPTER HOLDS ANNUAL CHRISTMAS PARTY

THE third annual Christmas party of the Worcester Chapter, R.S.E.S., was held Tuesday evening, December 15, at Trow Lodge, Sterling. Forty guests were welcomed at the receiving line by President and Mrs. Michael F. Colbert, Past President, and Mrs. H. Pierce Goodney, and Entertainment Chairman and Mrs. Arthur J. Osper. State President and Mrs. Charles C. E. Harris were honored guests with Mr. Harris extending season greetings to the assembly from the other state associations.

Community singing of carols and hymns was under the direction of Robert F. Lyons of Marlboro. After a buffet lunch served by Mrs. Amos E. Stuart, the members and their wives exchanged gifts. Santa Claus was impersonated by Second Vice-President Harry E. Manchester. General dancing followed.

During the evening the party was delayed for twenty minutes for a state-wide blackout test. For this period Willrose E. Hanson, George A. McKiernan and Albert E. Moors filled in with recitations and readings.

The above lines tell the story of our Christmas party according to the accepted theory. But as in our daily toil in which there is frequently a distinction between theory and practice, so it was with our party. It was more like this. . . .

Refrigeration Men Gang Up and Party

The members and their wives came early and hungry and susceptible to colds. Entertainment Osper came late, but he arranged to combat the hunger and the germs. The Committee greeted and collected in one handshake. Mr. and Mrs. Trow led the boys and girls in a hectic series of novel games and dances that left the players limp.

To prevent additional limping, Bill Tierney guarded the punch bowl to keep it from spilling and from being splashed. Camera Cronk was flashing around as usual and if he caught some of those gentle twirls and falls, the pictures if published and if publishable will defrost the front mat of the R.S.E.

After the first square dance, the boys doffed their coats and the girls dropped their pocketbooks. Formality was out. The girls were sporty and let us call them by their first names. At the blackout recess, some of the boys told stories and some of the stories told on the boys. Lipstick was the only item passed out for this 20-minute period.

To get the right husband with the correct wife, Bob Davis called for a pairing of couples to march to the buffet table. Promenade a la Rommel. The greatest compliment that could be given to Mrs. Trow and to Mrs. Stuart, her assistant, would be for the folks to enjoy the food. What a bunch

of flatterers! The home-made ice cream with the chocolate and marshmallow-mint sauce was one of the popular items of the party. But it is safe to assert that no one was seen to glide by the chicken, crabmeat, spaghetti, apple pie, pumpkin pie or squash pie.



RANDOM SNAPSHOTS AT THE WORCESTER CHAPTER CHRISTMAS PARTY

1—On his left knee, Charlie Harris. On the right knee, Mrs. Harry Manchester; looking for a knee, Mrs. John Brosnan. Seated in the background, Pierce Goodney, making repairs to his spectacles. The game previous to this one required Pierce to run the gauntlet between two rows of ladies armed with newspaper rolls.

2—On the left, Mrs. William Tierney and Jim Hammill. On the right, Mrs. Bob Lyons and Will Hanson.

3—Left to right, Mrs. Michael Colbert, Mike Colbert, Mrs. Charles Harris, Charlie Harris, John Brosnan and Entertainment Chairman Tony Osper. In the center, Santa Claus with Mrs. John Brosnan on the left and Mrs. Tony Osper on the right.

4—On the left, Mrs. Stanley White. On the right, Stanley White. In the center, Snow-White, alias Charlie Harris, the popular president of the Massachusetts State Association.

Mr. Dealer: **HERE'S HOW TO GIVE
YOUR WAR EFFORT...**



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SPOT WELDER COOLER



**...A SHOT IN
THE ARM!**

DEALERS who want to increase their value to our Country's war effort and at the same time boost their sales, will find the Temprite Self-Contained Spot Welder Cooler an ideal year 'round sales item.

War plants now using the Temprite Spot Welder Cooler enthusiastically report that it "increases production," "reduces rejects" and "improves quality of workmanship" far beyond their expectations.

Positive temperature control of the spot welder tip insures a uniformity of welded joints, prolongs the life of the copper welding tips and permits welding operations to be carried on continuously.

While the use of a temperature control unit improves the operation of all types of Spot Welders, it is of particular importance to war plants using Spot Welders on aluminum. The peculiar structure of aluminum requires that the welder tips be maintained at a constant controlled low temperature at all times, if satisfactory welding is to be obtained.

The Temprite Spot Welder Cooler is a self-contained cabinet assembly completely equipped with all of the necessary parts including a condensing unit and water circulating pump. It is finished in green Krinilac lacquer and is ready for immediate installation.

Users say the Temprite unit is an important aid to war production and we urge you, Mr. Dealer, to assist the war effort by bringing this necessary item to the attention of the war plants in your area.

Write or wire TODAY for full particulars.



To those dealers who have not been contacting war plants and who may not have the latest information on priority requirements, we will be glad to send complete information. Simply address our Sales Department.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous

45 PIQUETTE AVENUE



Liquid Cooling Devices

DETROIT, MICHIGAN

Tony Osper promised refreshments and gave us a home-made stuffing. Harry Manchester took a different stuffing and became S. Claus to distribute the 25 cent Grab Presents. They could have been called Gag Presents. A laugh or a grin or a blush per present. Then, to keep the members from complaining, Osper, Manchester and Davis awarded attendance prizes. A small grocery store. Johnny Osper, a prize winner, shared his award. The proper Christmas spirit, but when Johnny got it back he still had the Christmas spirit but no prize spirit.

Oh—it was the best party ever and the lovely ladies were the best. Entertainment Osper will have no trouble selling tickets to his next affair, even though President Colbert wanted his money back because his present had only one handle on it.

(Adv. No service calls, Wednesday, Dec. 16th. Worcester Chapter R.S.E.S.)

(Adv. Please do not return empty cylinders. Hiram Walker Chemical Company, Unlimited.)

(Adv. Mother's Helper for Hire. Amos Stuart Dishwashing Company.)

(Adv. Wanted a typewriter with keys in Braille. J. Brosnan, Secretary.)

R.S.E.S. Chapter Notes

ONTARIO MAPLE LEAF CHAPTER

November 20—Bill Marshall presided over the meeting and, under unfinished business, brought up the question of poor attendance. The remedy after some discussion seemed to be that more personal contact with the members was required. J. W. McKee pointed out that the meeting night might have something to do with it, and it was moved and seconded that meeting nights in the future be the second Friday of each month.

Bill Marshall also approached the subject of war time prices and charges for labor. This was followed by a discussion by Ken Wood on the categories of air conditioning, electrical equipment and refrigeration, informing the group that in the future it was hoped that an amendment to the War Board Order and that these classes of work would be placed in their correct categories.

Turning to the subject of out-of-town calls, he suggested that hourly rates plus transportation should be specified rather than car expense as heretofore. He pointed out that the time may soon arrive when it will be necessary to take a train to the

customers premises, possibly involving an over night stay in a hotel, which would be more expensive than driving. Mr. Marshall also mentioned that a ceiling price on used refrigerators was expected in the near future.

On the educational program for the evening Walter Smallwood gave an interesting talk on Two and Three Stage Refrigeration systems used in extremely low temperature work. His talk was much appreciated by those who attended the meeting and Mr. Smallwood was thanked by Mr. Price at the conclusion of the presentation.

LOS ANGELES CHAPTER

November 25—This was the 47th regular meeting of the Los Angeles Chapter and was held at Scully's Cafe with a large percentage of the members present.

After an enjoyable meal the business session was opened by W. C. Irving. Some of the first items brought before the members was a recently issued R. E. M. A. membership roster followed by a discussion of P-126 certificates, which it was pointed out may be frozen in the near future.

Lawrence Roth brought to the attention of the members the fact that the excise tax on commercial controls, evaporators, condensing units and belts was removed as of November 1.

Some discussion on gasoline rationing and the routine necessary in making an appeal benefited those members having difficulty in securing sufficient gasoline.

The stamp drawing, the final event of the evening, was \$10 in defense stamps sold by Messrs. Cox and Kirkham, was won on ticket No. 72, held by Bob Caffee and ticket No. 69 held by Lawrence Roth.

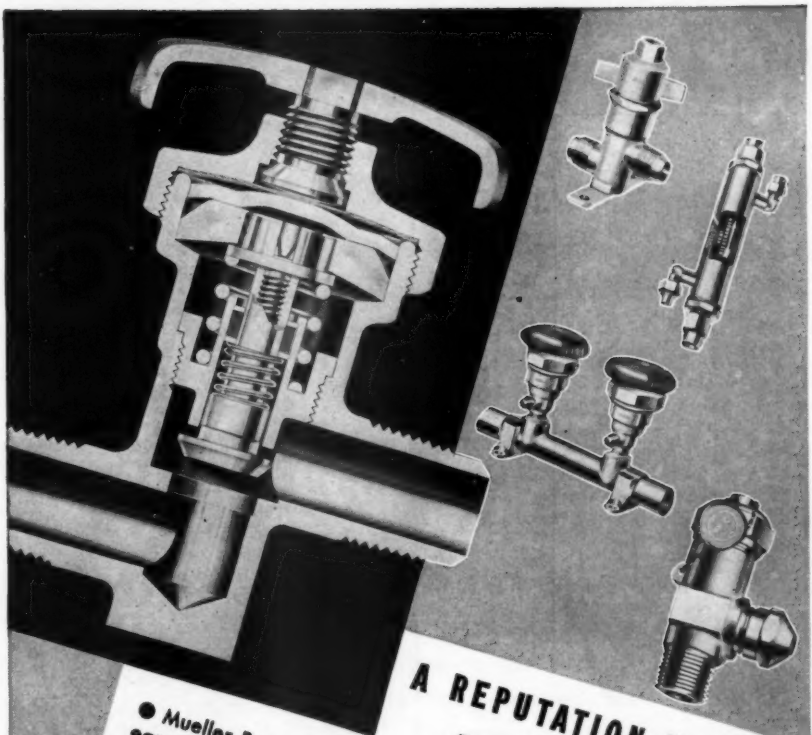
TWIN CITIES CHAPTER

December 1—The first part of the evening was devoted to miscellaneous business matters of the chapter among which was the Treasurer's report showing good conditions of the Treasury at the last meeting of the year. The Membership Committee read two new applications for membership, both of which were voted on and accepted.

The Gasoline Rationing Committee reported on their findings and were able to provide some interesting information.

Mr. Ingersoll requested the acceptance of his resignation from the Attendance Committee.

The Secretary was instructed after some discussion to mail Christmas cards to all



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● Mueller Brass Co. valves, fittings and accessories have a well earned reputation and are consequently doubly desirable at a time when refrigeration products are scarce and becoming scarcer with each passing month.

We can still supply many of the items you may need and to the extent that we are permitted, we shall continue to produce standard essentials for the Refrigeration Trade.

We sincerely hope that in the shortest possible time we can once more devote our full manufacturing facilities to serving the happier needs of the American market of a world at peace.

Mueller Brass Co. products have a built-in reputation for long life and quality. If you have a problem, write us. We'll do our utmost to help.

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HERVEEN

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THANKS YOU FOR YOUR
PATRONAGE IN 1942 AND
WISHES YOU A HAPPY,
PROSPEROUS NEW YEAR!

IN 1943, while our brave boys are softening up our enemies for the knock-out, may you continue to do your part as refrigeration service engineers. Refrigeration guarantees a wholesome military and civilian food supply, which is as vital to

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as men and munitions on our front lines. Food will win this war, no less certainly than those in the past. So, if possible, stay on the job!

HERVEEN will help you to do your work in satisfactory fashion.

HERVEEN is the modern replacement gas being used everywhere with great success to service **Meter-Misers**.

Many have solved their **Meter-Miser** troubles by using **HERVEEN**.

Most jobbers stock **HERVEEN**—if yours doesn't, write direct to

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chapters and all members outside of the Twin Cities area including those members in armed forces.

Announcement was made that the next meeting would be a joint meeting with the ladies, at which refreshments would be served.

The latter part of the evening was devoted entirely to the election of officers, results of which follow: *President*, Leo Ost; *1st Vice President*, Clarence A. McCafferty; *2nd Vice President*, H. R. Taylor; *Secretary*, H. R. Taylor; *Treasurer*, Donald E. Frank; *Sergeant-at-Arms*, Otto Chermak; *Board of Directors*, Geo. J. Lewis, T. H. Ingersoll and Ivan D. Harris.

DAYTON CHAPTER

November 18—A dinner party was held for the members and their wives in the Engineers Club on this date. Music was furnished during the dinner by Mrs. Janet Patterson and two of her students. Motion pictures followed the dinner.

During the business session of the evening it was decided that no meeting would be held in December and that the next meeting would be on January 7 at which time the election of officers would take place.

COLUMBUS CHAPTER

December 9—A novel feature of this meeting was the requirement that each member bring some small item suitable for a child and present it to the meeting. These gifts were later distributed to the children at the county home.

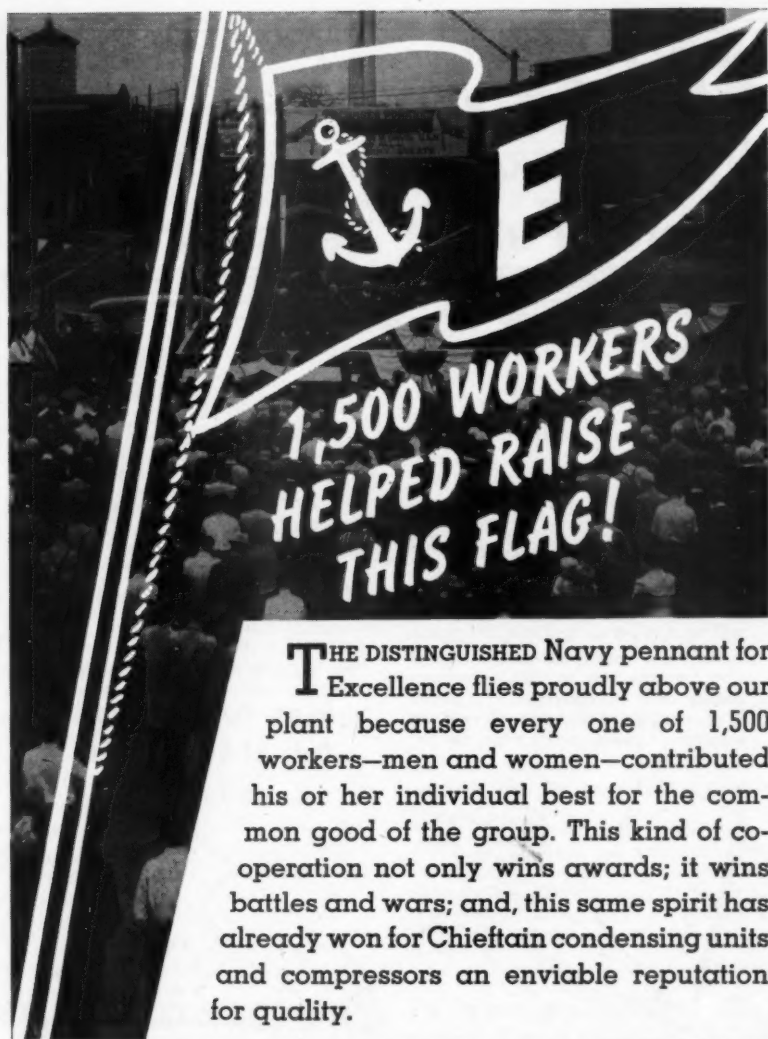
On the educational program of the evening a talking picture entitled "Welding and Machining Aluminum" was shown through the courtesy of Mr. Reynolds of Alcoa. The picture proved very interesting to the group and aroused some discussion.

The balance of the evening was devoted primarily to chapter business and discussions of the welfare of the members.

Refreshments were served following the meeting.

WESTERN MASSACHUSETTS

November 15—The Second Annual Meeting of the chapter was held at the Hotel Bridgway in Springfield. All three chapters of the state were well represented with particular note being given to a good delegation from the new chapter in Hartford, Conn. A delegate from Providence, Rhode Island, was also present, making a total of more than 70 members in all.



THE DISTINGUISHED Navy pennant for Excellence flies proudly above our plant because every one of 1,500 workers—men and women—contributed his or her individual best for the common good of the group. This kind of co-operation not only wins awards; it wins battles and wars; and, this same spirit has already won for Chieftain condensing units and compressors an enviable reputation for quality.

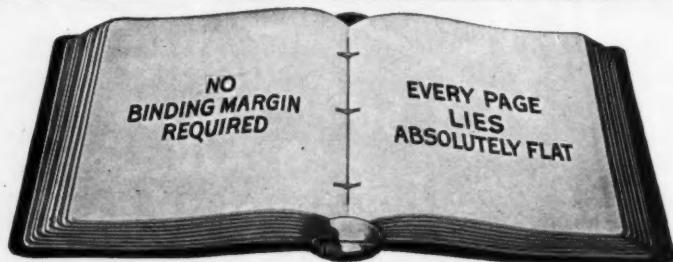
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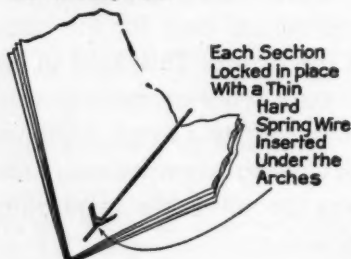
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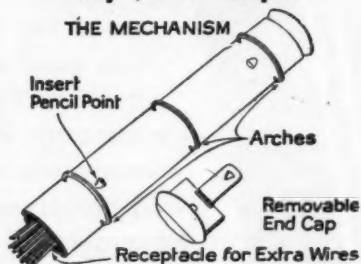
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IN
ALL BRANCHES
OF
REFRIGERATION

Write Us Giving Full Experience

A business meeting was held early in the day at which time the following officers for the coming year were elected: *President*, Charles Harris; *Vice President*, Harold C. Lamber; *2nd Vice President*, William Tierney; *Secretary*, Chas. A. Adams; *Treasurer*, T. H. Cronk; *Sergeant-at-Arms*, J. Lawrence Hall; *Directors*, Walter Quimby, M. F. Colber and Gerald Bradford.

While the men were thus engaged, the ladies were entertained by a showing of the film "Home Insulation."

During the general meeting session, Mr. Harris, President, welcomed the guests of the meeting and this was followed by notes from National Vice-President, S. B. Garland. A film on locker storage was also shown.

An adjournment was declared during which a fine banquet was enjoyed by everyone. The principal speaker of this part of the program was Dr. Allan Stockdale, Staff Lecturer of the National Association of Manufacturers. His talk was on the subject of the America of the Future.

W. H. Bliss of the War Production Board followed with a talk on priorities. Mr. Bliss

also served during the question period following the meeting.

Entertainment in the form of music and sleight-of-hand brought the annual meeting to a close. The entire program was an enjoyable one and the meeting was considered a big success.

MILE HIGH CHAPTER

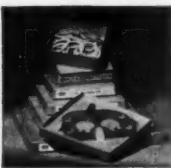
December 15—Chas. Land, Vice President, of the chapter conducted the meeting and after the usual business routine Mr. McCombs, President, gave a brief report of the meeting in Chicago, held in November for the benefit of service men, jobbers and manufacturers.

Gasoline rationing and price ceiling were discussed at some length during the evening and it was noted that the general opinion of the service men was that they were well satisfied with the gasoline allotment they have been receiving.

Low temperature refrigeration was another item of discussion with nearly everyone agreeing that this field would be a fast growing one after the war. Different types of low temperature home refrigerators were thoroughly discussed.

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SHUT-OFF VALVES

Semi-steel, carbon-steel, double-seated stem, Angle and Globe type.

ALL STEEL GAUGE SETS

Safety ball seats shut off liquid in case of glass breakage.

DEHYDRATORS

Furnished filled with Calcium Chloride, Activated Alumina, or Drierite and Silica Gel.

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Cylinder and Cone types, and liquid line scale trap.

ALL-STEEL LINE VALVES

Compact in design, completely rust-proof, Angle, Tee and Globe types.

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Harvey Olmstead of Penn Electric Switch Company provided the cigars of the evening, which while adding to the enjoyment did not help the atmosphere of the meeting place.

ILLINOIS VALLEY CHAPTER

November 15—One of the first orders of business was the appointment of Elmer Harris, Harry Hauser and John Sackey on the Nominating Committee with instructions to present a slate by the latter part of the evening. Glen Dresback, Roy Davidson, and Earl Dorman were appointed on the Auditing Committee. The meeting was then adjourned until 3:00 o'clock in the afternoon so that all members and their families could enjoy a Smorgasbord dinner served in the Coffee Shop of the hotel.

Among visiting members from the Springfield Chapter were Mr. and Mrs. A. L. Fait of Lincoln, Mr. and Mrs. J. J. Kline and Mr. and Mrs. J. H. Pokora of Springfield.

After the dinner the meeting was again called to order for the purpose of electing officers. Those elected are as follows: *President*, Emil F. Luckert; *First Vice President*, John Sackey; *Second Vice President*, Dave

Feeser; *Secretary*, Henry Loercher; *Treasurer*, Wayne Eakle; *Sergeant-at-Arms*, Earl Dorman; *Educational Chairman*, Glen Dresback; *Chapter Directors*, Clyde Tobias, Harry Hauser, Oscar Carlson, Roy Coyle and Roy Davidson. Henry Loercher was elected to the State Board of Directors.

December 18—This was a regular meeting of the chapter held in the Jefferson Hotel in Peoria. The meeting had been postponed one week so that the members of the chapter could attend Herman Goldberg's Christmas Party in Chicago.

The out-going President, Dean Reynolds, called the meeting to order, the main business of which was the installation of new officers. The new President, Emil Luckert, then took over the meeting.

The educational program consisted of a discussion on service and repair problems.

INDIANAPOLIS CHAPTER

December 22—President Salter called the meeting to order and the business routine of the evening got under way.

Educational discussion included Kelvinator Instruction Books by I. E. Weber, and

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judging by the number of requests for these books received the discussion must have been interesting. The annual election of officers then took place with the following results:

President, Seth Wells; *Vice President*, Earl Thomas; *Secretary*, Luther Hartzag; *Treasurer*, Luther Walker; *Sergeant-at-Arms*, D. Jacobs; *Board of Directors*, J. A. Salter, I. E. Weber, Noah Mohr, Russell Duncan and J. A. Roberts.

The newly elected officers were installed and the latter part of the evening was conducted by the new President.

Ladies Auxiliary

TRI-STATE AUXILIARY

December 13—The annual Christmas dinner was held at the home of Mr. and Mrs. Claude Brunton in Huntington. This was to be the regular monthly meeting, but business was forgotten for most of the evening.

A delicious chicken dinner was served at 6:30 to all the members of the auxiliary and their families. Mrs. Donald Young presented each of the ladies with a lovely corsage. After dinner everyone retired to the living room where the men discussed the business situation for the coming year.

At the close of the evening the President and his wife, Mr. and Mrs. Donald Young, were presented with an electric percolator.

KANSAS CITY AUXILIARY

November 10—After the regular business session of the meeting had been dispensed with the choosing of a family which the chapter hoped to adopt for the Christmas season was discussed. The men's chapter presented the auxiliary with a check for \$20 to help provide for this. Mrs. DeWilde and Mrs. Visger were appointed as a committee of two to visit the family.

After further discussions on chapter business matters the meeting was adjourned and coffee and pumpkin pie were served.

November 24—Mrs. DeWilde presided over the meeting and business minutes occupied the first part of the evening. The annual Christmas party came in for a good deal of discussion and some interesting correspondence was read by Mrs. Hoover.

A nomination of officers was held with the announcement that the election would take place at the next meeting.

Mrs. Visger told of a visit she and Mrs. DeWilde made to the needy family adopted by the chapter to provide for their Christ-



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EVEN though civilian production of refrigeration has been curtailed, this industry's products are still being manufactured in a steadily increasing volume, for they are essential to our war effort . . . and this means there is a growing need for SERVICE.

Wherever Cold Plates are used there is service business for you . . . go after it in the following:

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mas. The family consists of a mother, who has suffered from infantile paralysis, and four children, two girls, seven and twelve years old and two boys, eleven and thirteen years old. Mrs. DeWilde stated their ages in order that the members might secure clothing for them. It was agreed that the chapter would purchase new shoes for the children, if needed, also stockings and under clothing. Members brought donations of canned goods for the family to the meeting.

More business was conducted following this discussion and the meeting wound up with coffee and doughnuts being served.

ILLINOIS VALLEY AUXILIARY

The ladies met at noon on Sunday, November 15, and one of the first orders of the business was the annual election of officers, with the following results: *President*, Gladys Luckert; *Vice President*, Frances Tobias; *Secretary*, Frances Falt; *Treasurer*, Ann Loercher; *Sergeant-at-Arms*, Mac McGill.

Very little business was conducted at this time since the program of the combined meeting included much entertainment which the ladies wished to attend.

For the PERMANENT REPLACEMENT of STRATEGIC MATERIALS



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CHEMICALLY RESISTANT TUBING AND FITTINGS BY HODGMAN

Saran Tubing by Hodgman is a tough thermoplastic specially made to replace strategic materials such as aluminum, stainless steel, nickel, copper, brass, tin and rubber. It is adaptable for use under high working and bursting pressures and is resistant to most chemicals. Its insulating qualities, flexibility and ease of bending make it extremely valuable in installations requiring the transport of oil, gas, air, water and corrosive chemicals. . . . Flare type fittings of the same material make it possible to install a complete system with no more tools than a sharp knife and a flaring tool.

*Pat. No. 2169931

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HODGMAN RUBBER CO.

FRAMINGHAM, MASS.

NEW YORK CHICAGO SAN FRANCISCO
261 Fifth Avenue 412 South Wabash St. 121 Second St.

TEMPRITE ANNOUNCES NEW MODEL SPOT WELDER COOLER

THREE important advantages are claimed for the Temprite model 580-WC spot welder cooler, according to a brochure from the Temprite Products Corporation, 47 Piquette Avenue, Detroit, Mich. They are listed as follows:

1. Longer life of welding tips with consequent reduction in refinishing jobs.
2. Consistent uniformity of weld due to constant tip temperature.
3. Increased production per welder.

"While the use of the Temprite model 580-WC results in improved operation of all types of spot welders on all metals," says the company, "it is of particular importance on aluminum spot welders where the peculiar structure of the metal requires that the welder tips be maintained at a constant controlled low temperature at all times. Research has established that 40° F. is the ideal coolant temperature for satisfactory operation on production welding and the Temprite system will deliver water at this temperature direct to the welding tips at a constant rate within its listed capacity."

Repairs or Replacement

Make present equipment do for the duration! Use the genuine replacement parts shown below. We always carry a complete stock.

GENUINE REPLACEMENT PARTS FOR

**CHIEFTAN
UNIVERSAL COOLER
SERVEL
COPELAND
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Automatic
HEATING & COOLING SUPPLY CO.
647 W. LAKE ST.
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DISTRIBUTORS OF
GATES BELTS
FOR REFRIGERATION

USE

VISOLEAK

Ally yourself with the Industry program of CONSERVATION. SAVE refrigerant and time. SIMPLIFY leak detection problems.

* * *

VISOLEAK shows you those "hard-to-find" leaks, and is successful with all refrigerants. Use four fluid ounces plus one ounce for each 10 lbs. of refrigerant to treat a system.

4 Ounce Size.....	\$ 1.00
8 Ounce Size.....	1.75
1 Pint Size.....	3.00
1 Quart Size.....	5.00
1 Gallon Size.....	16.00

Buy it from your jobber or write direct to

WESTERN THERMAL EQUIPMENT CO.
5141 Angeles Vista Blvd. - Los Angeles, Calif.

Model 580-WC is a special self-contained cooling unit designed to supply a constant flow of low temperature water to electric

spot welder tips and transformers. The unit operates as a water circulating system and can be used to operate one, two or three

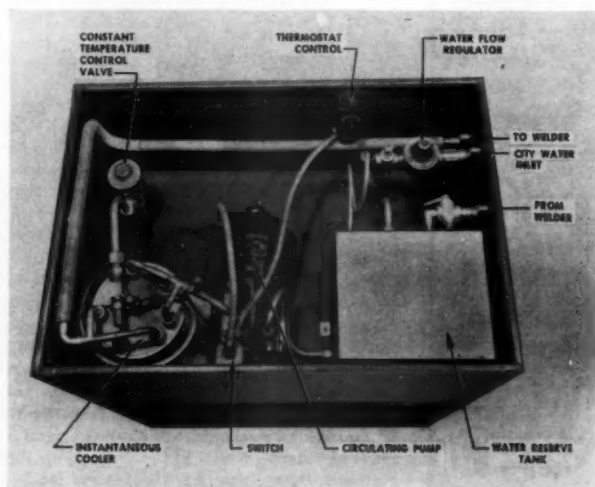
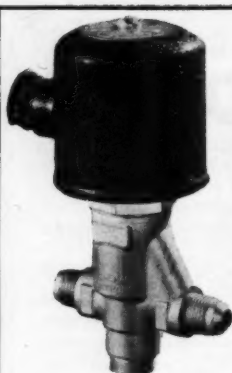


Photo-Diagram of
New Temprite
Spot Welder
Cooler.



NEW

GENERAL CONTROLS

K - 20 - 5 REFRIGERANT VALVE

**Recommended for Small Applications and
for Fractional Tonnage Installations**

FEATURES: Low power consumption; quiet,
two - wire solenoid; packless construction;
forged bodies; moisture resistant coils; tight
shut-off; handles all refrigerants. Ask for
Catalog.

GENERAL CONTROLS

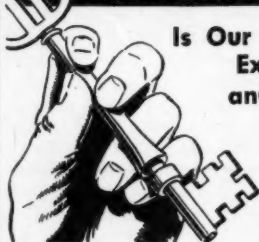
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and Careful
Attention to
your
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for

REFRIGERATION AND AIR CONDITIONING SUPPLIES AND EQUIPMENT

*Write for our big catalog,
on your letterhead*

The HARRY ALTER Co.

1728 S. Michigan Ave. 134 Lafayette St.
Chicago, Ill. New York, N. Y.

separate spot welders depending on the maximum heat load of the welders and the resistance to flow through the welder water circuit.

This model is equipped with the proper size Temprite instantaneous water cooler and all accessories including the Temprite patented constant temperature control valve, a one-horsepower refrigeration condensing unit and a one-half horsepower water circulating pump.

The system is capable of circulating 120 gallons of water per hour against a spot welder pressure drop of 100 pounds gauge. Pump is equipped with an adjustable bypass valve so that the rate of water flow through the spot welder assembly can be controlled.

Cabinet is constructed of heavy gauge furniture steel properly rust proofed and finished in olive green Krinilac lacquer.

BUCHER JOINS DAYTON RUBBER CO.

THE appointment of C. D. Bucher as director of purchases for the company has been announced by the Dayton Rubber Manufacturing Co., Dayton, Ohio. He succeeds J. C. Cunningham who has resigned. Mr.



C. D. Bucher, Dayton, Ohio

Bucher comes to the new position with a broad experience of over 15 years in purchasing, having served two of the Akron rubber companies in the capacity of purchasing agent and buyer of engineering materials. He is a graduate of Ohio State University in mechanical engineering, and a past president of the Akron branch of the National Purchasing Agents Association.

SYNTHETIC RUBBER PLANT FINDS REFRIGERATION ESSENTIAL

REFRIGERATION equivalent to the cooling effect produced by the melting of millions of pounds of ice every 24 hours is achieved by a compact unit in a new Du Pont synthetic rubber plant, where temperatures of many degrees below zero are required for the manufacture of an essential ingredient.

A relatively small amount of a Du Pont refrigerant in efficient refrigeration and air conditioning units not only replaces fantastic quantities of ice but, more important, gives the control of heat and humidity without which much vital war production would be slowed or stopped.

Precision parts of airplane motors, for example, must sometimes be machined to tolerances as low as one ten-thousandth of an inch. To accomplish this feat, temperature and humidity must be controlled continuously within extremely narrow limits.

A fine machine tool cannot turn out the same size article during a cool midnight shift as during a hot noon shift, unless the temperature at the machine is the same. Heat expands the tool and varies the size of the part enough to disrupt a final assembly line completely. The temperature control necessary for maximum precision is obtained through the use of refrigerants.

Modern, safe windowless war factories are possible only because the air in them can be constantly cooled and cleansed. Terrific heat in these factories, generated by power tools, lights and the workers themselves, must be dissipated to make working conditions bearable.

Tips of spot welding machines in aluminum welding of airplanes heat up rapidly. Refrigeration of the machine now eliminates time formerly lost while the machines cooled, and speeds production of this vital ordnance. Similarly, aluminum rivets in airplane factories are kept cool to preserve ductility before use, thereby lessening chances of the rivets cracking.

Flying instruments: bomb sights, range finders, gun sights, radio parts, must be laboratory tested under the extremes of tropic and stratosphere conditions, which are simulated with the help of refrigeration and air conditioning.

Lenses and prisms often must be ground within tolerances of several millionths of an inch; atmospheric control is necessary to prevent variations in dimensions and to keep



Dayton

V-BELTS

FOR ALL LEADING MAKES OF HOUSEHOLD APPLIANCES

In the interest of conservation, see that Victory Vital V-Belts are properly installed with rust-free pulleys in correct alignment and with proper belt tension.

THE DAYTON RUBBER MFG. COMPANY
THE WORLD'S LARGEST MANUFACTURER OF V-BELTS
DAYTON, OHIO

DAYTON RUBBER EXPORT CORPORATION
28 Pearl Street, New York, N. Y., U. S. A.

IN 1943 **DEPEND on BLYTHE** **YOU KNOW YOUR JOB!**

Right well you did it, too, during the difficult days of 1942. You have made a valuable contribution to the war effort.

OUR JOB IS TO KEEP YOU SUPPLIED

We advertise that you can depend on us for replacement parts and materials. The way we made good in 1942 is your guarantee that we shall not let you down in 1943.

H. W. BLYTHE CO., 2334 South Michigan Avenue, **CHICAGO**

EXPANSION VALVES

Rebuilt or Exchanged

Automatic (any make).....	\$1.25
Thermostatic (any make).....	\$2.75
Water valves	\$2.25

COLD CONTROLS

Domestic	\$2.00
Commercial (low or pressure).....	\$2.25
Commercial (high & low).....	\$2.75

All work done on money back guarantee.

Special price on quantity.

(All fittings must accompany order)

REFRIGERATION SURPLUS DEALERS

2208 N. Karlov Ave.

Chicago, Ill.

Electrimatic Solenoid Valves



Type SL

For Freon, Methyl, Sulphur
Oil, Air and Water

Ask your jobber for details
or write to

The Electrimatic Division
of the Simoniz Company
2100 Indiana Ave. Chicago

DOLE

VACUUM PLATE

COOLING and FREEZING UNITS

C H I C A G O

GREASE RESISTANT
AND ODORLESS

JARROW REPLACEMENT DOOR GASKETS

• Long life, resilient
and conform to original specifications.

RECOMMENDED
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LEADING
JOBBERS

JARROW PRODUCTS
420 North La Salle St.
Chicago, Ill.

lenses dust free. Refrigeration even governs the amount of moisture in air in blast furnaces manufacturing pig iron, giving reduced fuel consumption, increased output, uniform production.

Refrigeration is required today in the manufacture of powders and explosives, drugs and pharmaceuticals, chemicals and plastics, communications equipment, military vehicles, wherever atmospheric conditions must be controlled within narrow limits.

Refrigeration and its partner, air conditioning, have assumed new industrial roles in mechanized war which will open untold fields when hostilities cease.

AIR CONDITIONING PROVES ITS WORTH IN WAR EFFORT

AT the Army Air Corps depot, Robins Field, Wellston, Ga., a young American industry is proving its worth in the war effort. Developed only three decades ago by Dr. Willis H. Carrier, air conditioning is accomplishing many varied and essential tasks as Air Force technicians speed work on repairs to planes, motors, instruments and other equipment.

A visitor to this bustling air depot would see four major buildings constructed of reinforced concrete and windowless to make them bomb resistant and capable of round-the-clock operations, despite possible black-outs. Air conditioning makes possible the use of structures maintaining 75-degree temperature and 45 per cent relative humidity for 24 hours a day, summer and winter.

But equally important is the fact that scientific control of temperature and humidity keeps out unseen saboteurs; rust, dust and corrosion. The success of our airmen in combat or on bombing missions depends in great measure on the accuracy of the instruments they use. Many of the instruments have extremely delicate parts which are rendered inoperative by dust or corrosion. They also require very accurate calibration. Thus, low temperatures are necessary at all times to minimize perspiration on hands of workers, perspiration which would cause corrosion. Furthermore, there are ferrous parts in most instruments which must be protected against rust.

Here at Robins Field, air conditioning solves these problems and contributes importantly to the repair of tachometers, gyroscope equipment, parachutes and other precision equipment.

In the Depot Supply Building, another phase of air conditioning, low temperature refrigeration, protects photographic film insuring that it will retain its sensitivity.

Robins Field boasts one of the busiest control towers in the nation, a "greenhouse" on 80-foot stilts. With planes coming in for repairs, planes which have been repaired being tested, and cargo ships with supplies taking off for sub depots, traffic in and out of the field is exceptionally heavy. The efficiency not only of the man in the tower, but also of delicate instruments is protected against the weather by control of temperature and humidity in the control tower.

The use of air conditioning at this air depot throws light on recent statements by a prominent engineer to the effect that "control of the air" is important in more ways than one.

NEW BOOKLET ON A-C WELDING

SPEED is increased 20 to 30 percent and power costs are cut one-third with the Flexarc A-C Welders described in a new booklet by Westinghouse Electric and Manufacturing Co.

The new 12-page booklet compares advantages of a-c and d-c welding. A-C welders increase output because of the absence of magnetic arc blow, ease in using heavy electrodes with higher currents, and ability to make good welds in all positions.

A complete line of Flexarc A-C Welders, with current ratings from 100 to 500 amperes, is described and illustrated in the booklet. Featured are the 500-ampere industrial welder for high-speed, continuous welding on all types of heavy construction; and the 300-ampere portable welder.

A copy of B-3136 may be secured from Dept. 7-N-20, Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

Classified Ads

Rate: Two Dollars for fifty words or less.
30 cents for each additional ten words or less.

PEACE WILL BRING CHANGES AND IMPROVEMENTS in refrigeration methods and equipment. Do you have a practical idea NOW to improve existing equipment or for a new piece of equipment? Complete all necessary patent procedures NOW in order to be in position to negotiate with manufacturers when industrial production is again our primary aim. Send for free 48-page illustrated book containing valuable information about patents, sale of inventions and other information of value to men with practical ideas. Write today. Victor J. Evans & Co., 776-A Merlin Building, Washington, D. C.

CONTROL REPAIR SERVICE

Because of the shortage of materials, 1943 will be a very busy one for the Service Engineers. Fewer replacement parts will be available, necessitating more repairs.

Why not send your control jobs to us? We recondition controls equal to new at a small cost. All our work guaranteed for one year. Prices on request.

UNITED SPEEDOMETER REPAIR CO., INC.

342 West 70th Street
New York City

COLD CONTROLS & EXPANSION VALVES

repaired or exchanged

at the following prices, F.O.B. Chicago

Automatic Expansion Valves (All Makes)	\$1.50
Thermostatic Expansion Valves	3.25
Automatic Water Valves	2.50
Domestic Cold Controls (Modern Type)	2.50
Commercial Controls (Temp. or Pressure)	3.25
Commercial Dual Controls	3.25

ALL WORK GUARANTEED FOR 90 DAYS

NEW DUTY
2424 Irving Park Blvd., CHICAGO

WEST COAST CONTROL SERVICE

Cold Controls • Pressure Switches

One year guarantee
on all repairs

Original Factory Specifications

UTILITY THERMOSTAT CO.
4011 Halldale Ave., Los Angeles, Calif.

McKESSON NEW SALES MANAGER ANSUL CHEMICAL COMPANY

THE directors of the Ansul Chemical Company, Marinette, Wis., announce the appointment of L. C. McKesson to the position of sales manager. Mr. McKesson is



L. C. McKesson, Marinette, Wis.

known to many in the refrigeration trade as "Mac," and has served Ansul for fifteen years.

In 1927 he was employed as manager of the traffic department. In 1930 he was transferred to the Sales Department, and in 1938 was made assistant sales manager.

F. J. Hood, secretary and treasurer of Ansul, and former sales manager, will continue as sales director of Ansul and its subsidiaries, but will devote the major portion of his time to mounting executive duties.

NEW CATALOGS AND BULLETINS

RANCO, INC., Columbus, Ohio, manufacturer of controls, is making every effort to keep the supply of necessary replacement parts going for service men. In Bulletin 873, sent to jobbers, all controls and other parts made by the company are illustrated and described. The number of control models has been reduced to those most needed by the armed forces and for essential civilian requirements. When the war ends, or if materials become available sooner, the company will resume production of a more complete line. The preceding Ranco Bulletin 868 included some controls not listed in 873, but in the latter a list of all those omitted, with the nearest substitute, is given.

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GREATER CAPACITY—

From 1½ to 2 times as much as other Drying Agents

ACTS INSTANTLY—No delayed action in any system

REMOVES ACIDS—Prevents corrosion and formation of sludge

DOES NOT CAKE NOR POWDER—Assures free flow of refrigerant

You can keep existing refrigerators from becoming "old" refrigerators by giving your customers the type of service that prevents trouble and breakdowns . . . by making Davison's Silica Gel your working partner.

Ask your jobber for Davison's Silica Gel . . . he can supply you.

Keep 'Em Running Better with Davison's

SILICA GEL

THE DAVISON CHEMICAL CORPORATION

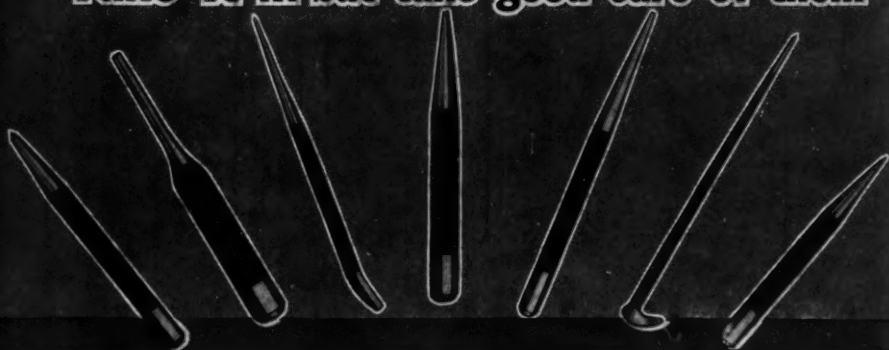
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BALTIMORE • MARYLAND

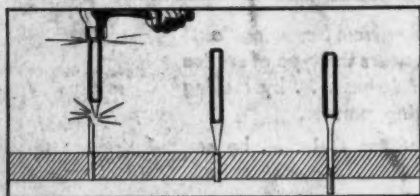
The Finest that Money Can Buy

Your **BONNEY** Punches Can

"Take It"... but take good care of them



TOOLS of all kinds are scarce and hard to replace because of war conditions. Present tool equipment must last for the duration. So *be smart* . . . take good care of your hand punches. Make sure you use the *right type* on every job. They're easy to break or damage if you don't.



For example . . . don't use a pin punch to start driving a pin. There's a swell chance of breaking it if you do, as shown by the illustration at the left in the drawing. Use a taper punch to start the pin (center illustration) . . . a few taps will generally loosen it . . . and then finish off with the pin punch (right).

Don't use a pin punch as a lining-up punch. It's not designed for that purpose and not heat treated to withstand that service. It will bend and possibly break if you do.

Bonney Punches are made to "take it". Drop forged of selected alloy steel . . . of steel selected especially for the work they must do . . . and carefully heat treated. Their heads will become battered from use . . . that can't be helped . . . but are sufficiently soft to be redressed with a file.

Made in 7 types . . . 12 sizes . . . a punch for practically every job . . . by tool craftsmen with pride in their ability to make fine tools. Every Bonney Punch is designed for a particular application. Make sure you use the *right size* as well as the *right type*.

Sure we want to sell Bonney Punches . . . want to sell all the Bonney Tools we can make . . . but we want to help you get the most out of those you now have. *Be smart* . . . take care of your Bonney Tools. They will last for the duration if you do. We don't want you disappointed in your inability to get all of them you want.



BONNEY FORGE & TOOL WORKS

Allentown, Pa.